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THE FAR EASTERN REVIEW

遠東時報

Engineering
Finance ❋ Commerce

Vol. IX., No. 8. ❋ SHANGHAI—MANILA ❋ January, 1913.

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Minister of Posts and Communications

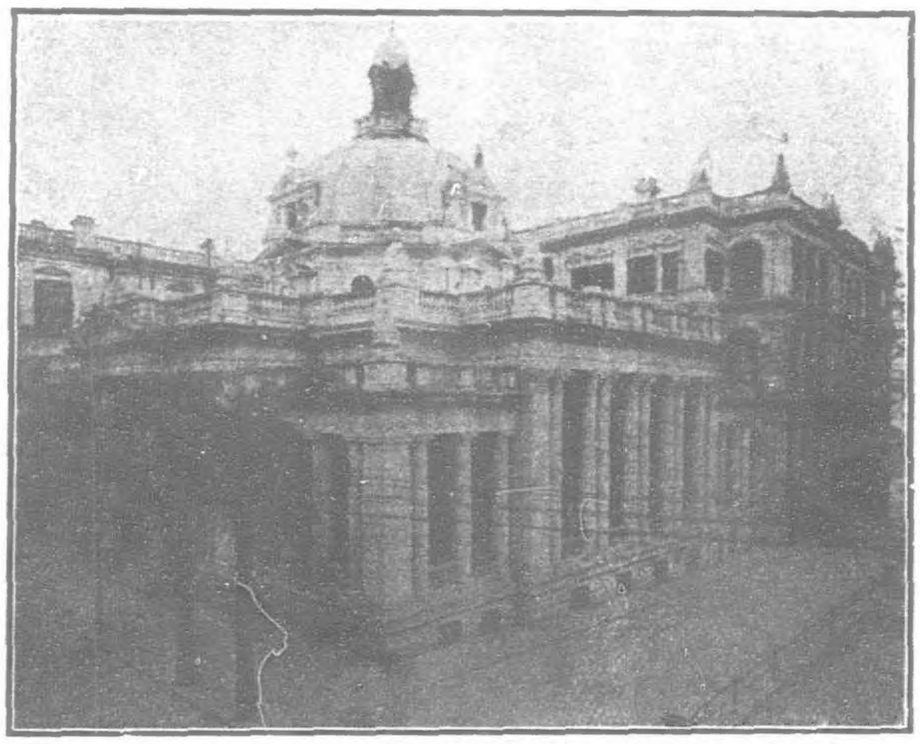
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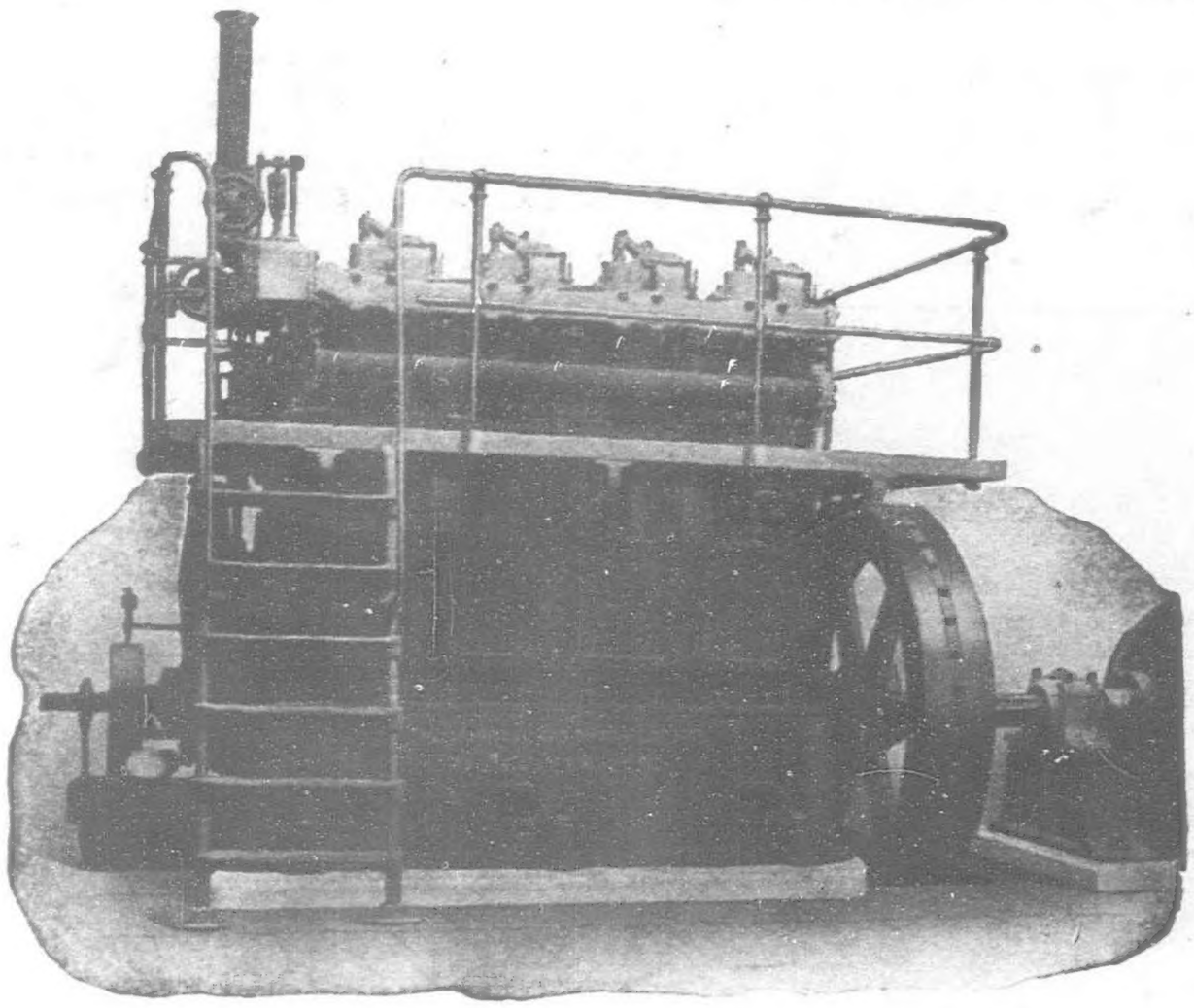
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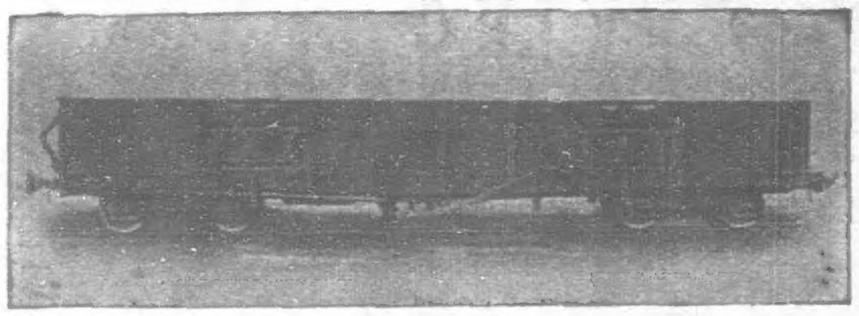
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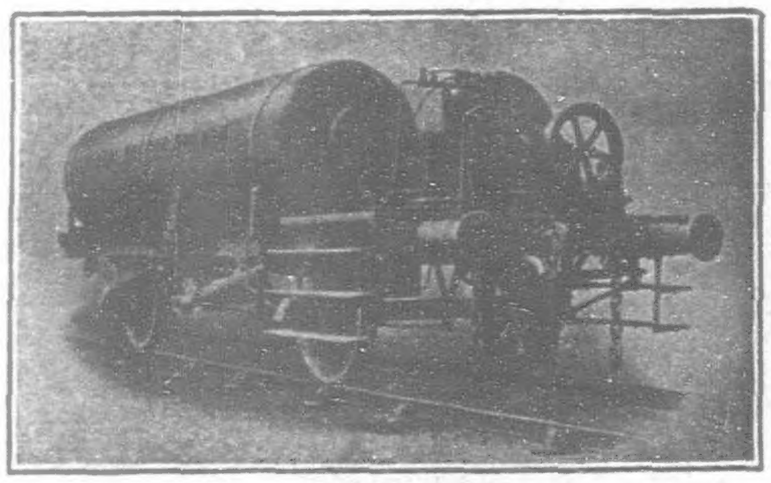
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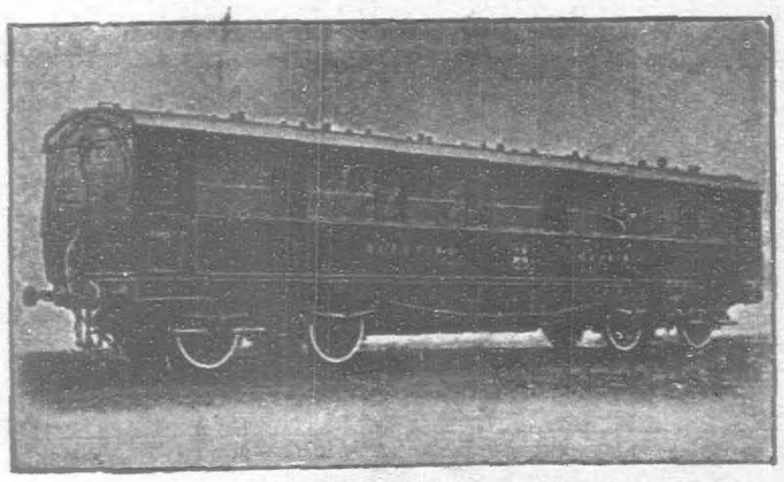
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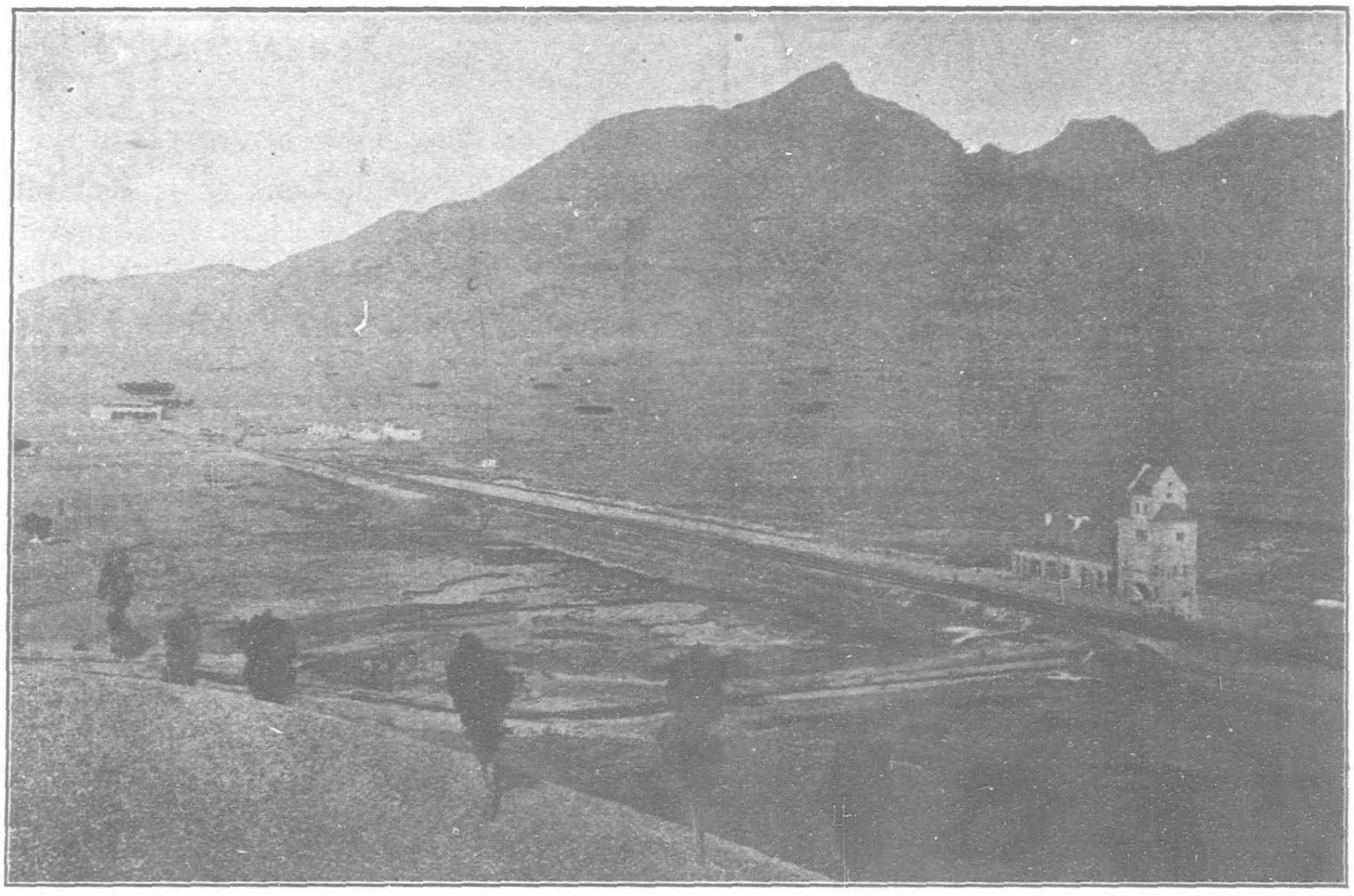
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CHINESE GOVERNMENT RAILWAYS

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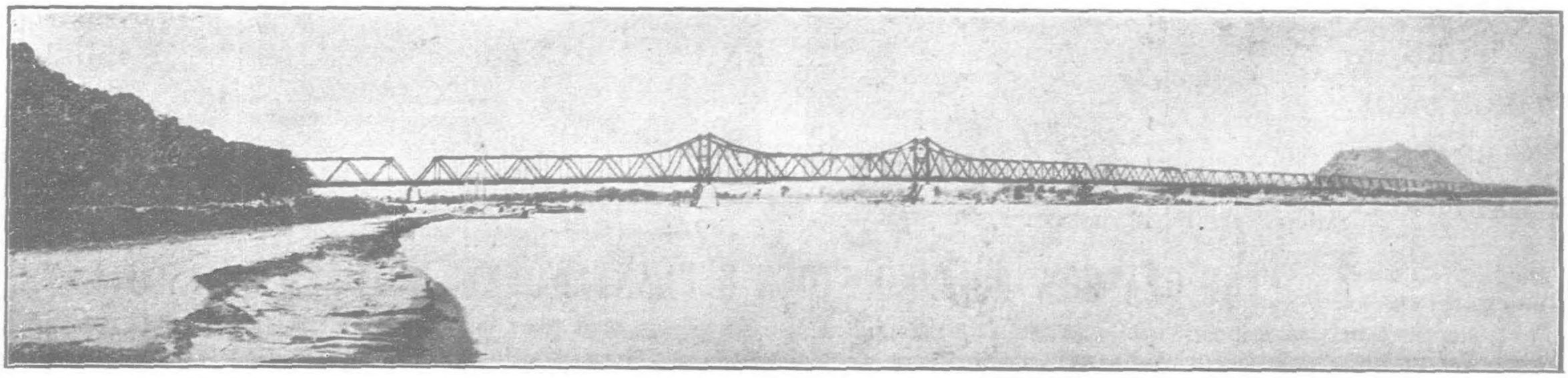


TIENTSIN-PUKOW RAILWAY, NORTHERN SECTION: THE STATION AT TAIANFU, TAISHAN, THE SACRED MOUNTAIN IN THE BACK GROUND

THE SHORTEST AND QUICKEST ROUTE BETWEEN PEKING AND SHANGHAI

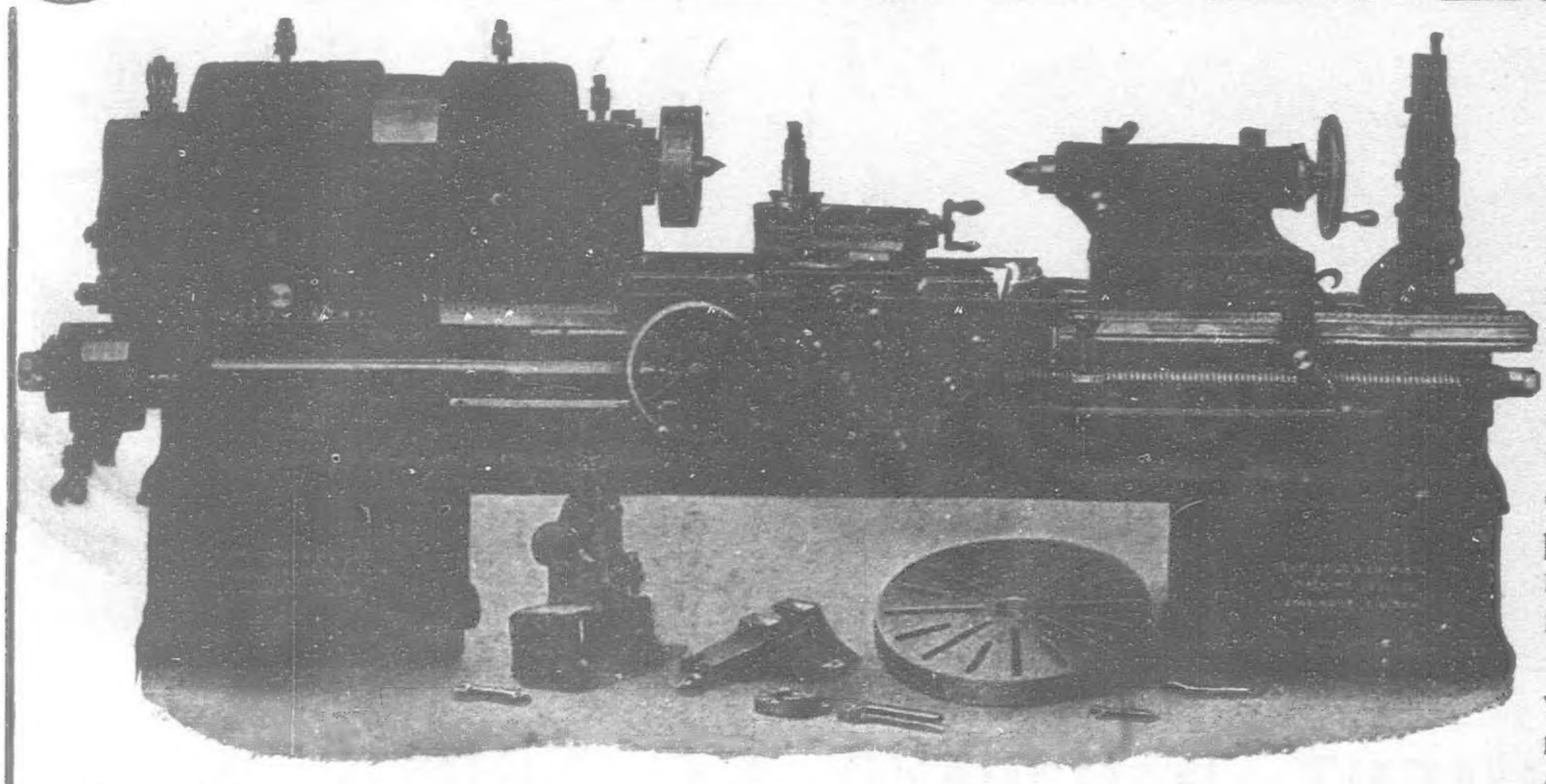
TOURISTS SHOULD NOT MISS THE TRIPOVER THIS SCENIC LINE, THROUGH THE HEART OF SHANTUNG PROVINCE, PASSING THE SACRED MOUNTAIN AND THE HOME AND TOMB OF CONFUCIUS, THE GREAT SAGE AND TEACHER. THE GREAT YELLOW RIVER BRIDGE IS ONE OF THE SIGHTS OF THE LINE.

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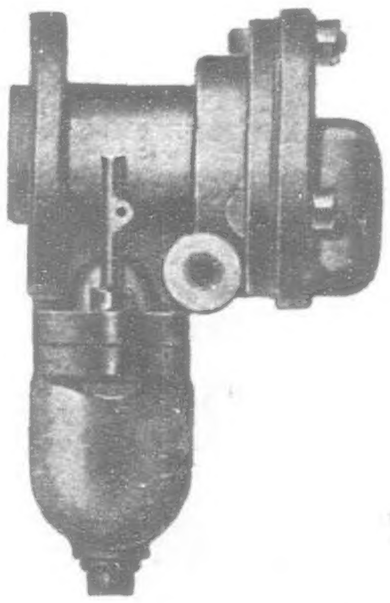
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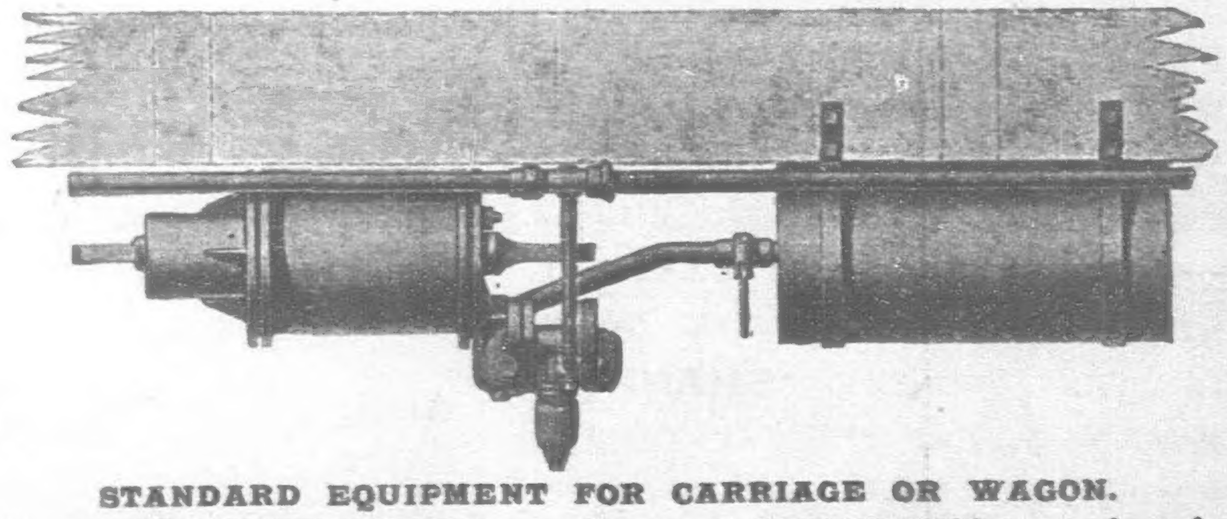
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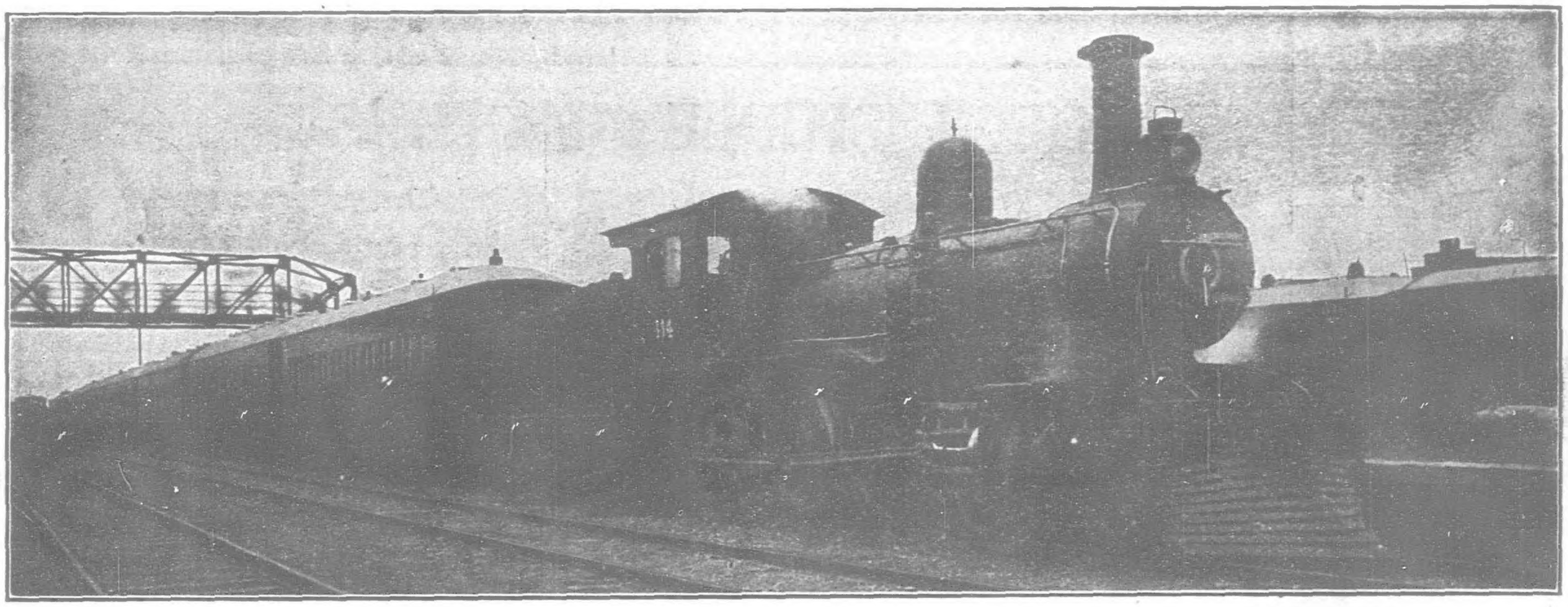
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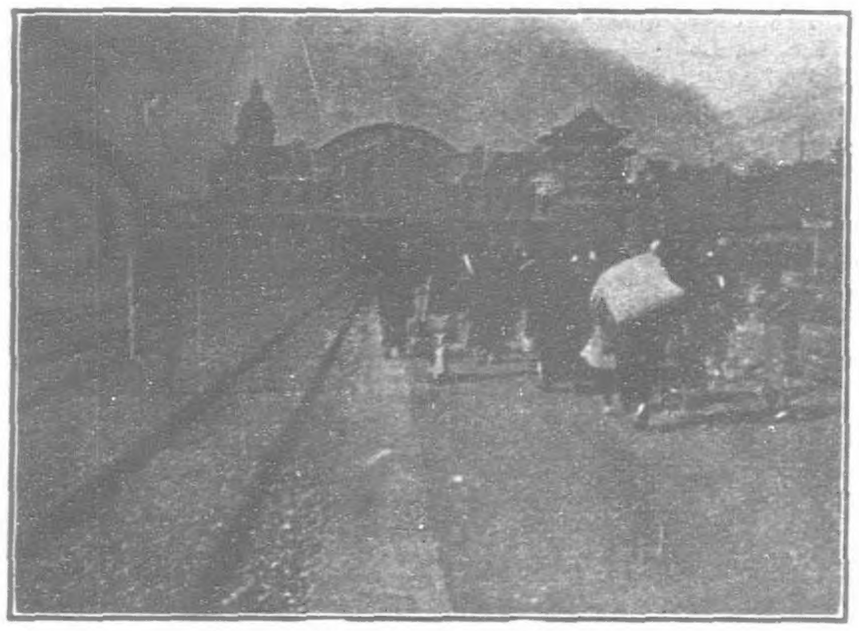
TRAIN DE LUXE AT TIENTSIN SETTLEMENT STATION

CHINESE GOVERNMENT RAILWAYS OF NORTH CHINA

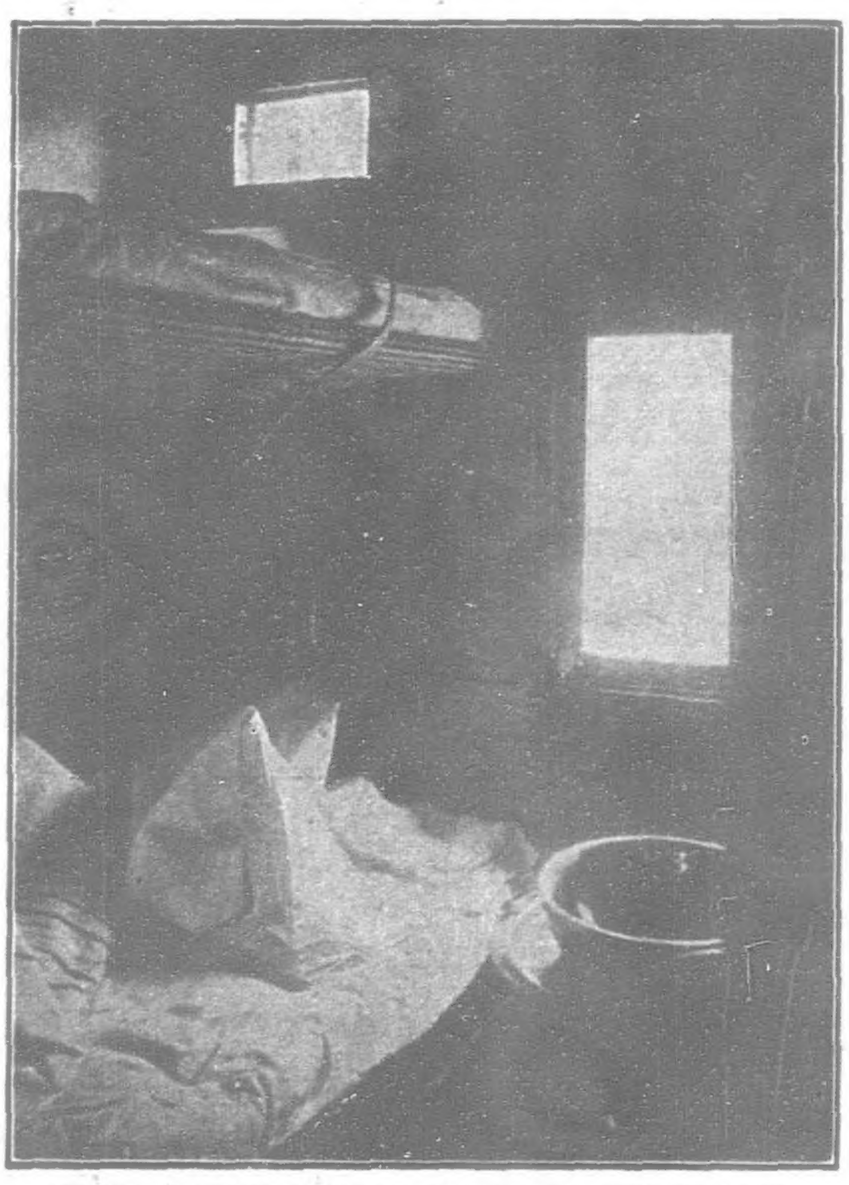
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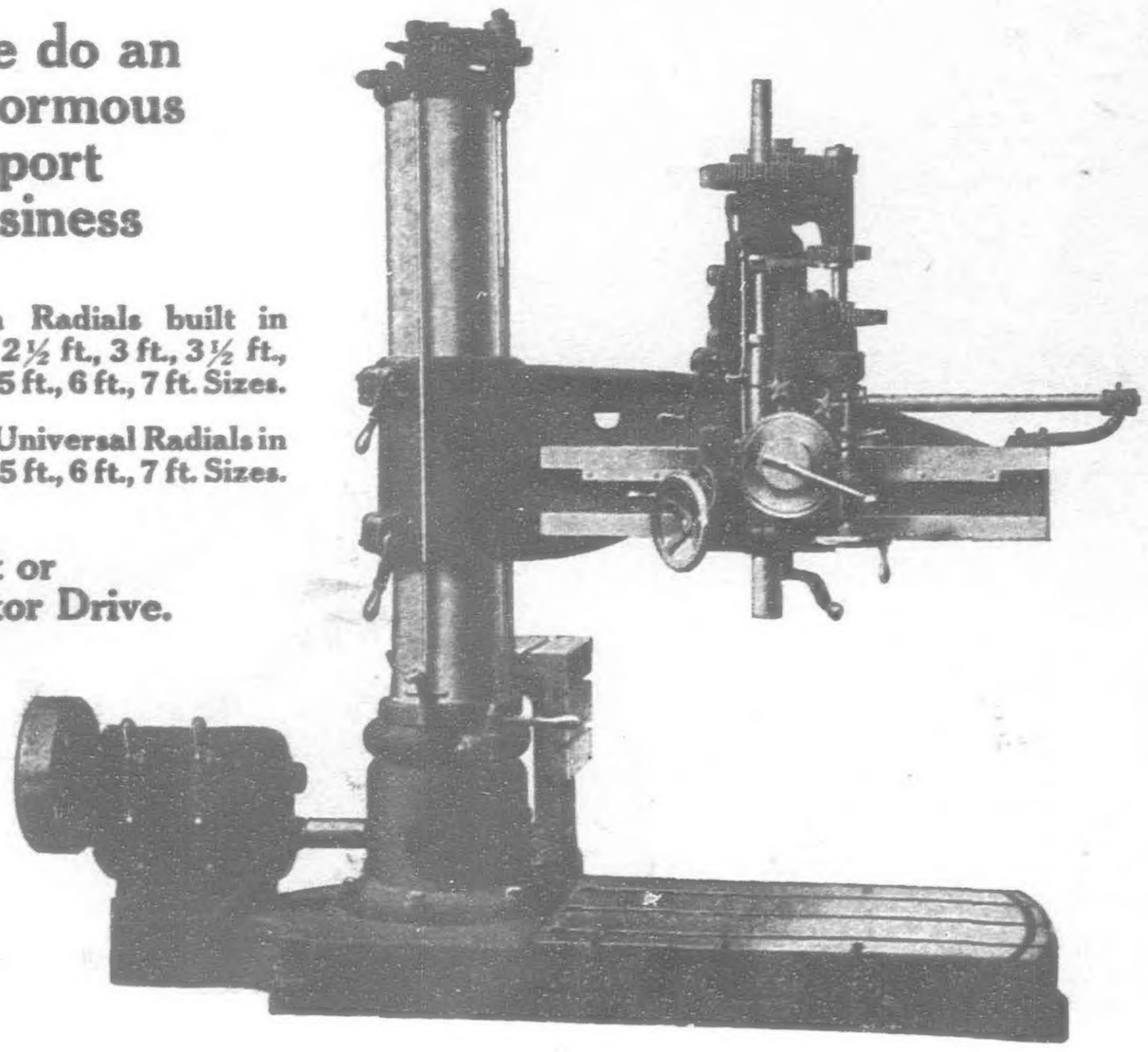
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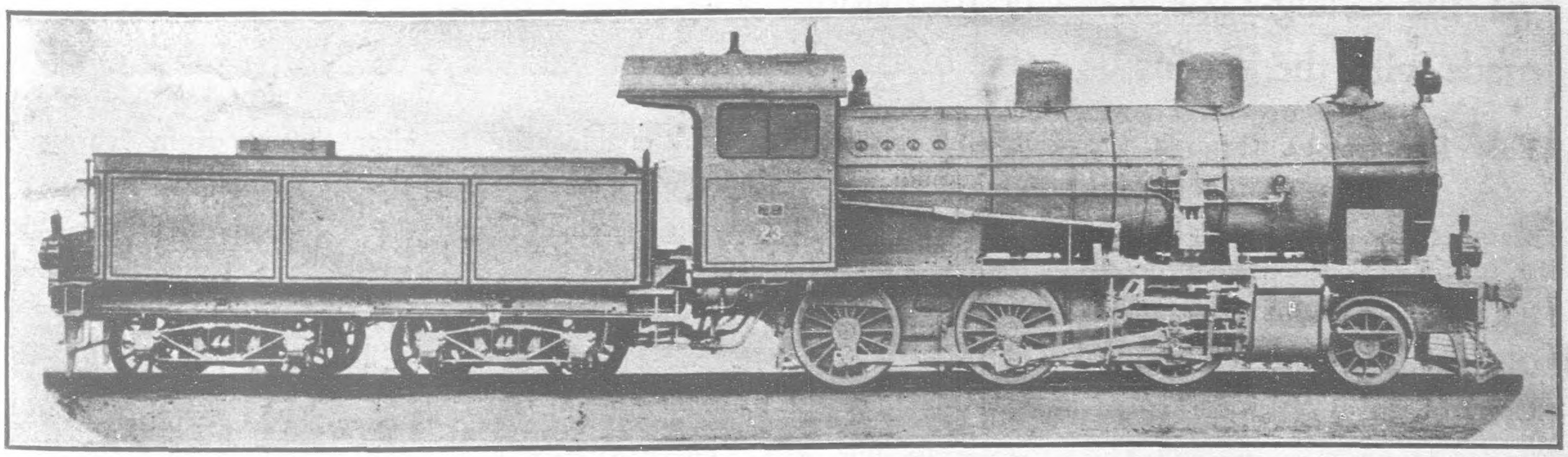
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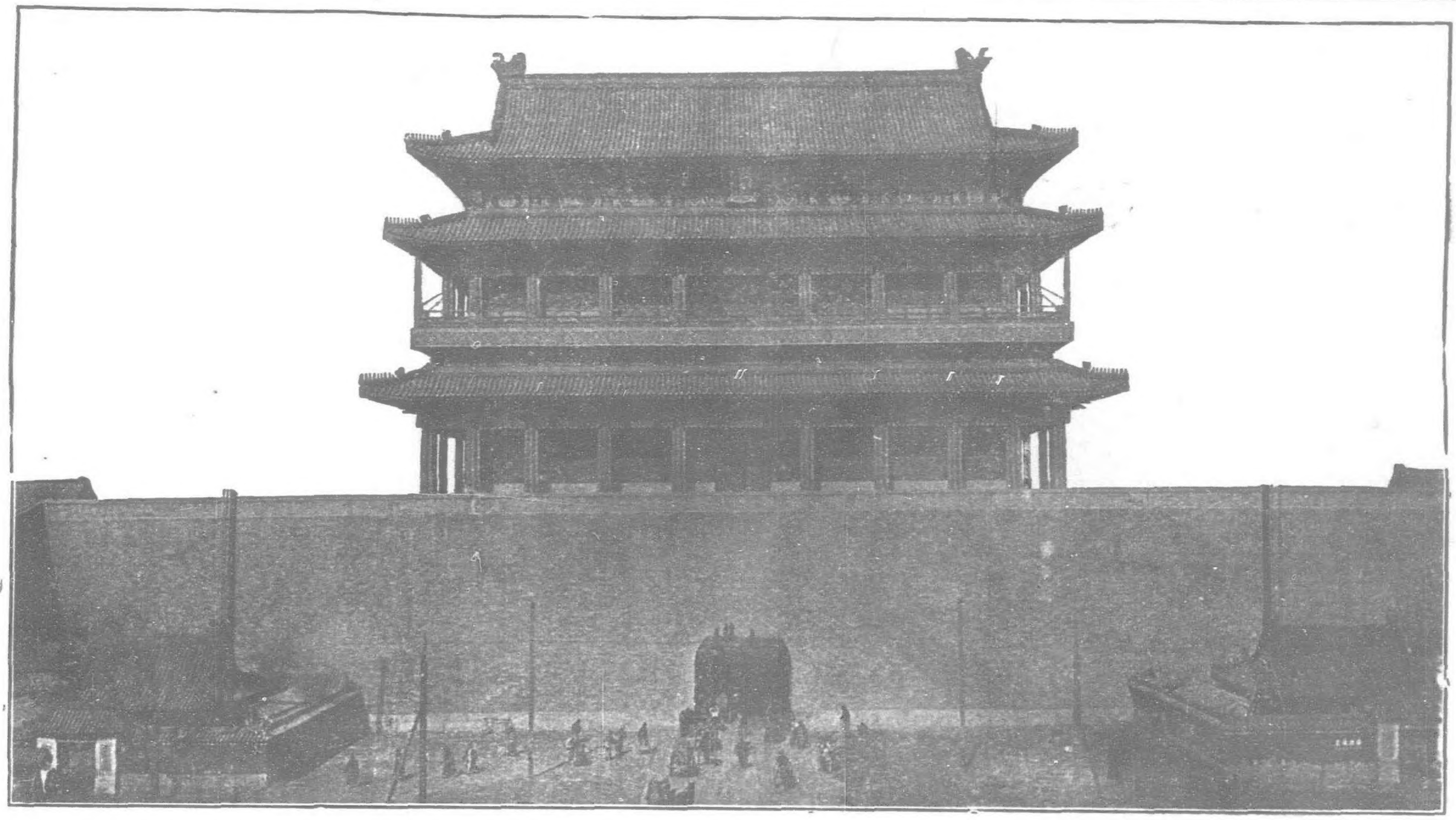
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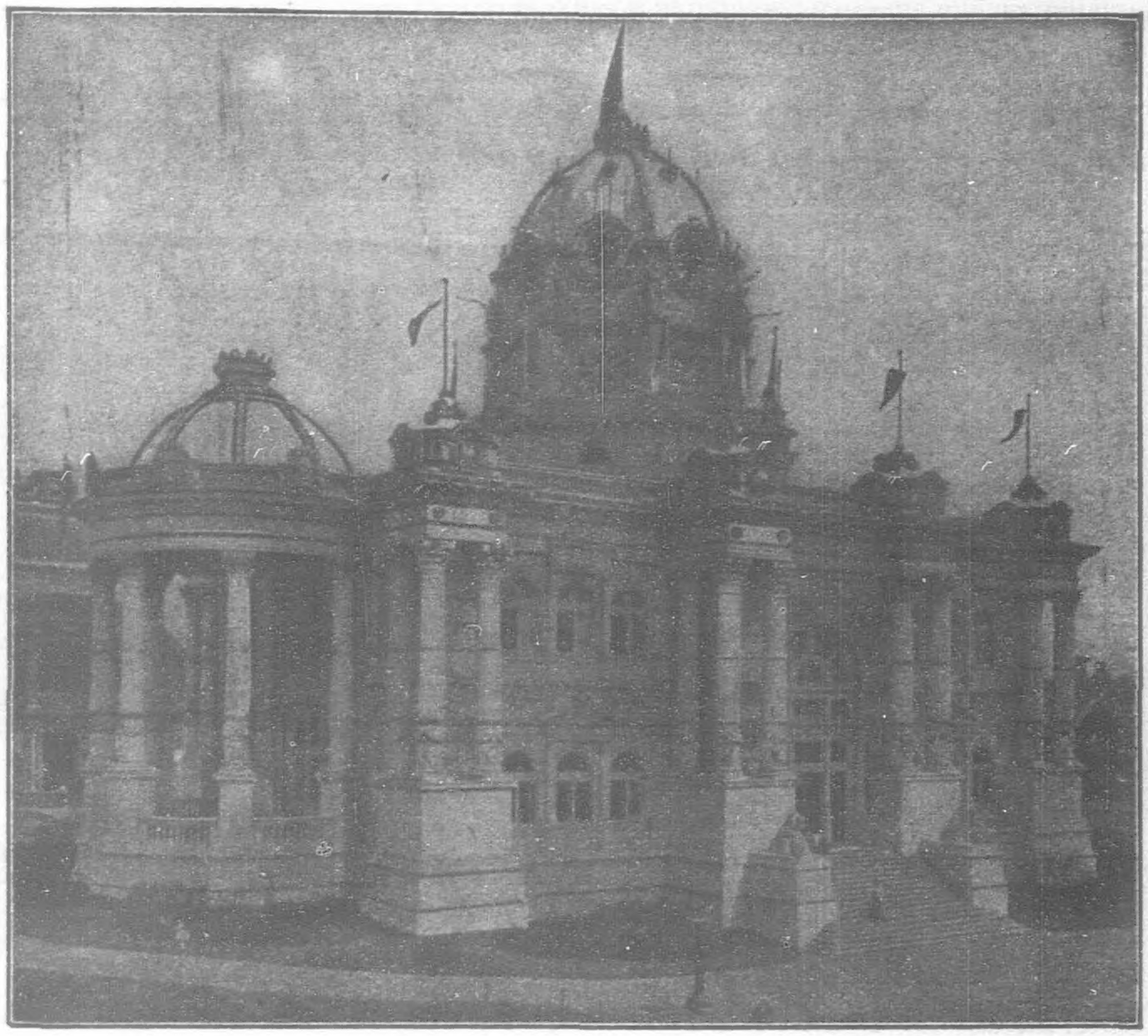
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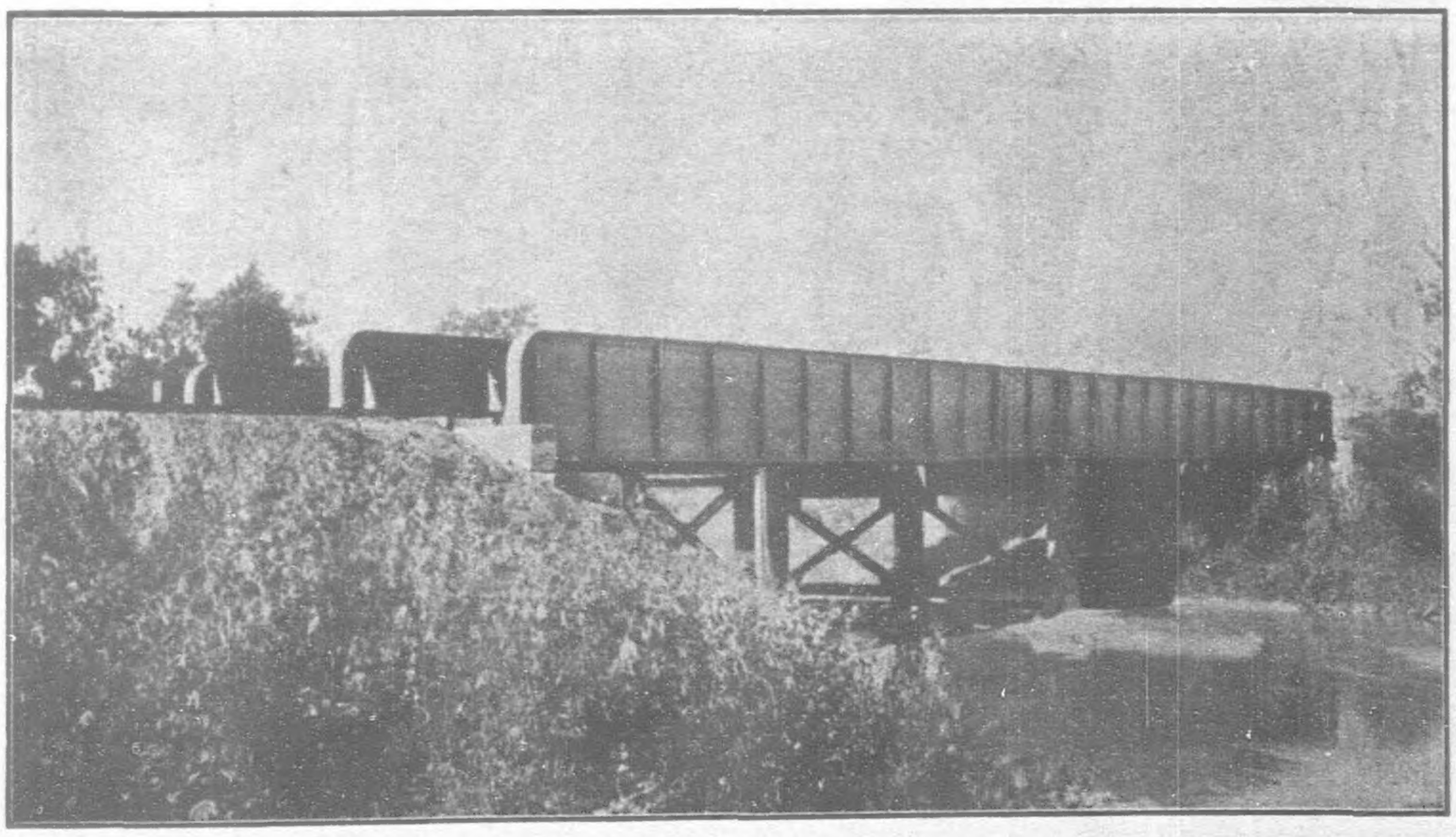
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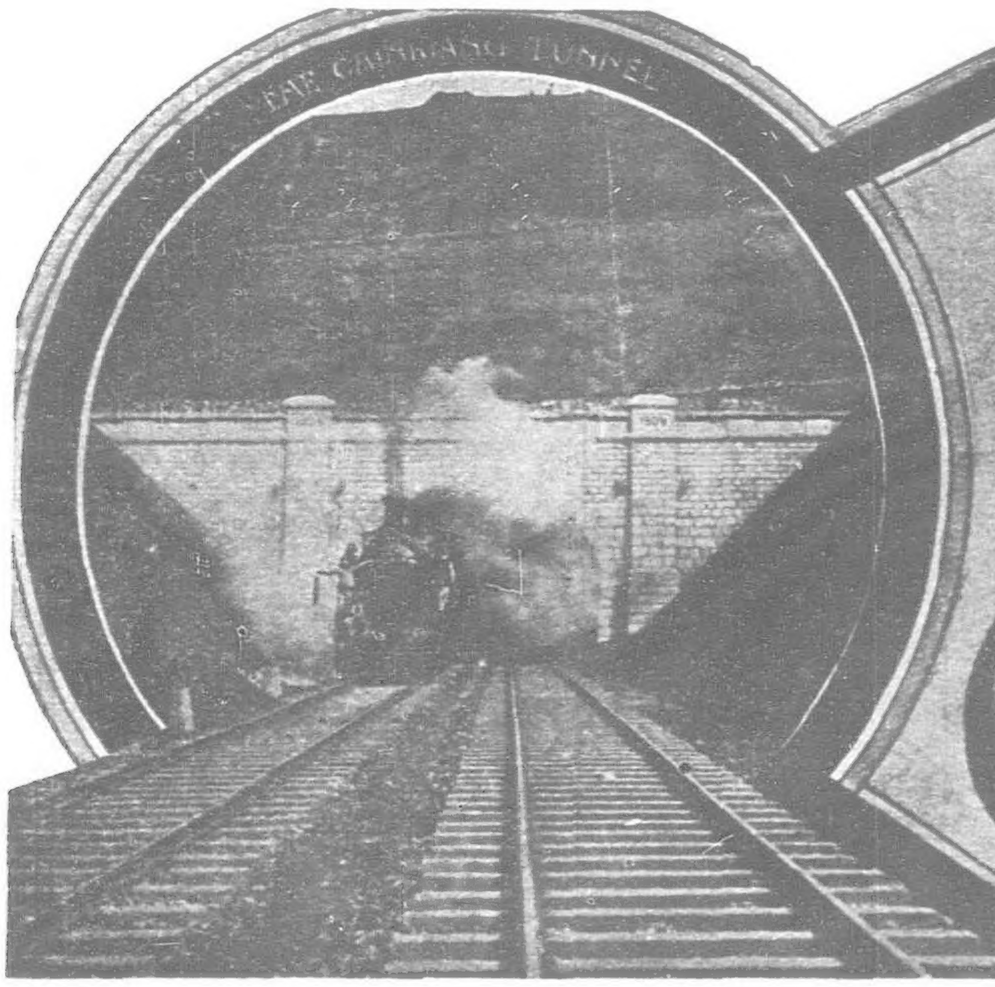
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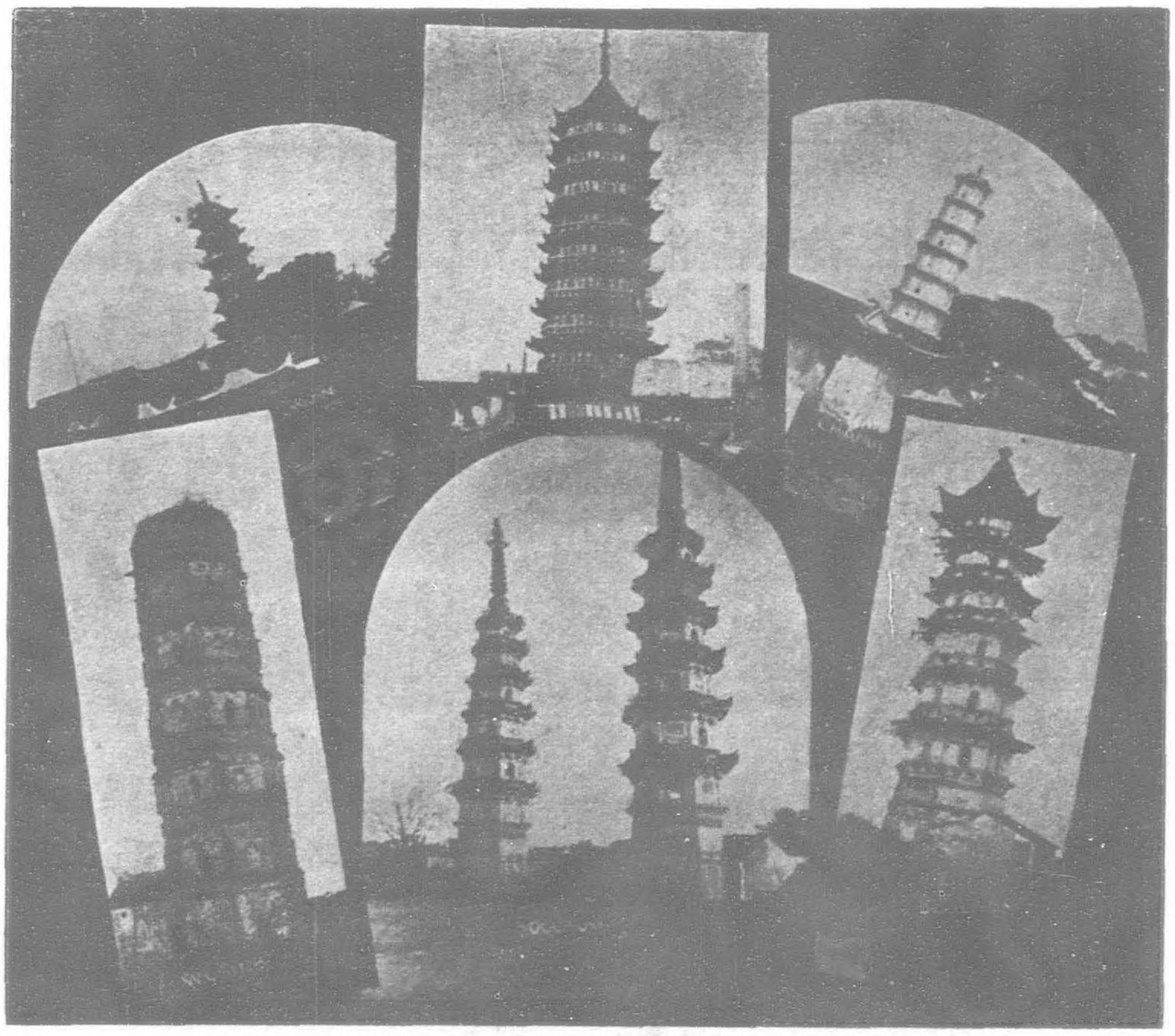
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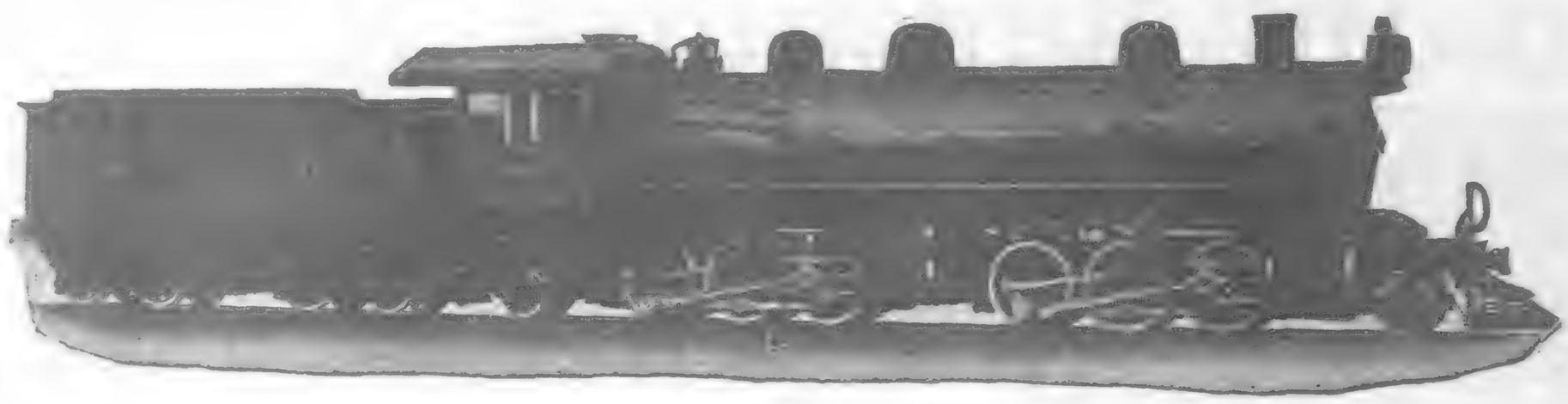


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DINING CAR

CONNECTIONS AT MUKDEN.—These Express Trains connect at MUKDEN with the PEKING-MUKDEN RAILWAY running via TIENTSIN and with the newly organized MANCHURIA-CHOSEN THRICE WEEKLY EXPRESS SERVICE between Changchun and Fusan: the MUKDEN-ANTUNG LINE (now running throughout on standard gauge) connecting with the KOREAN RAILWAY; by this route the journey between Europe and Japan is shortened by two days, and the sea voyage considerably reduced.

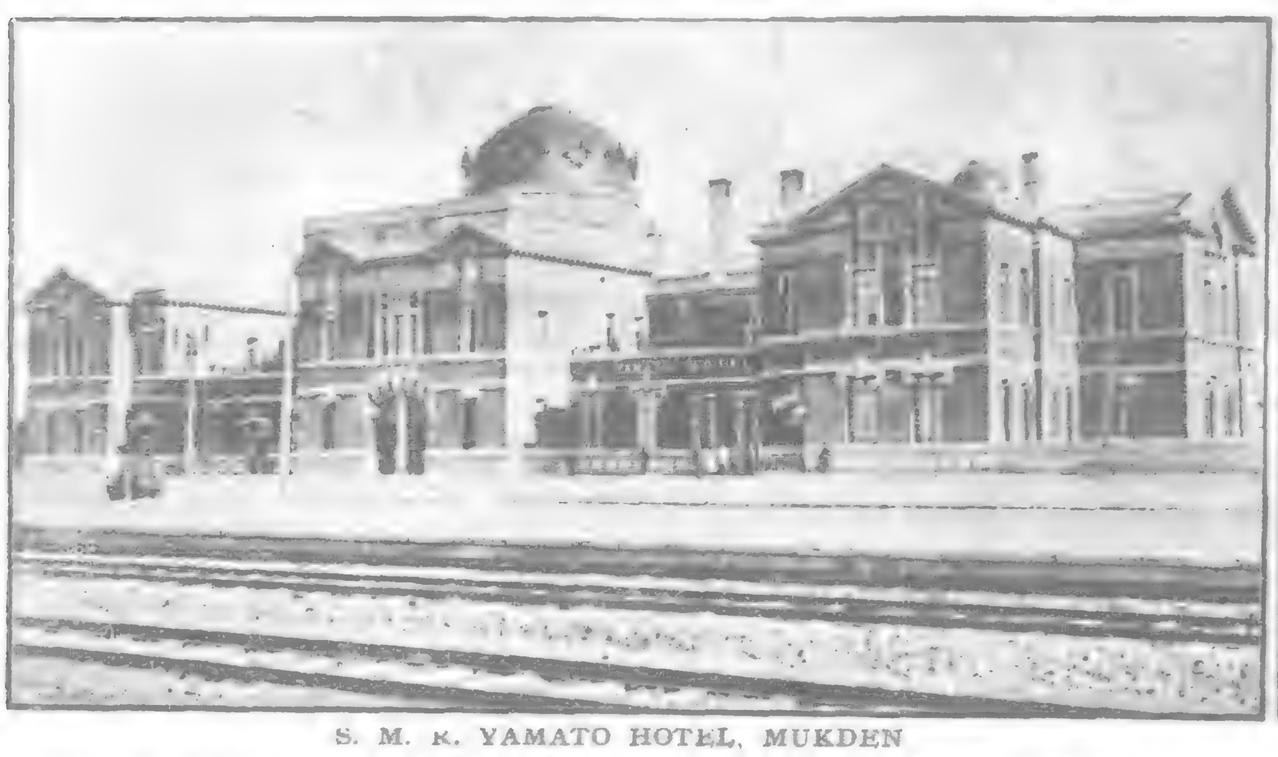
OTHER STEAMER CONNECTIONS AT DAIREN.—Regular Steamship Services are maintained from DAIREN to MOJI, KOBE, CHEMULPO, TIENTSIN, CHEFOO, TSINGTAU, and other ports in Japan and China.



S. M. R. YAMATO HOTEL HOSHIGAURA (STAR BEACH)

RAILWAY HOTELS.—YAMATO HOTEL (Tel. Add.: "Yamato") at DAIREN, PORT ARTHUR, MUKDEN, CHANGCHUN, and HOSHIGAURA, all managed by the Company on European lines and providing comfortable accommodation.
At Hoshigaura ("Star Beach"), the finest seaside resort in North China, 5 miles from Dairen, in addition to the hotel, there is a large number of bungalows (for hire at moderate terms), situated in a charming cliff garden and surrounded by beautiful scenery.

TICKET AGENTS IN EUROPE AND THE FAR EAST.—The INTERNATIONAL SLEEPING CAR & EXPRESS TRAINS CO.; The NIPPON YUSEN KAISHA, Shanghai; Messrs. THOS. COOK & SON; the REISEBUREAU DER HAMBURG-AMERIKA LINIE; and the NORDISK RESEBUREU. Time-tables, fares, literature, and any information can be obtained gratis upon application to the Traffic Department



S. M. R. YAMATO HOTEL, MUKDEN



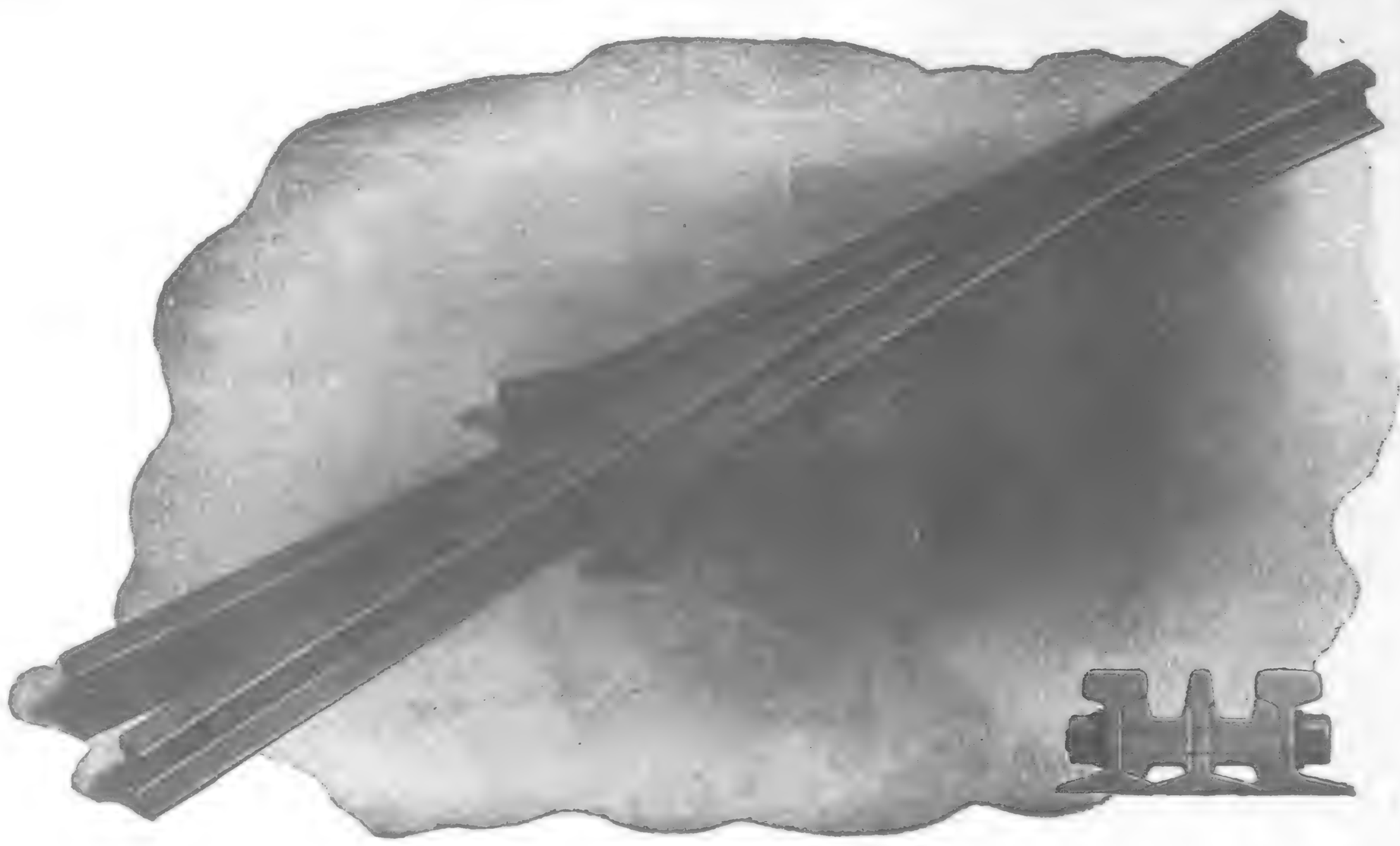
S. M. R. YAMATO HOTEL, CHANGCHUN

SOUTH MANCHURIA RAILWAY COMPANY, DAIREN, MANCHURIA

Tel. Add.: "MANTETSU" -:- Codes: A. B. C. 5th Ed., A-1, and Lieber's

CARNEGIE STEEL COMPANY
ILLINOIS STEEL COMPANY

Manufacturers of Bessemer and Open Hearth Steel



BEAMS
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COTTON TIES
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RAILS, Light & Heavy
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REPRESENTED BY

The United States Steel Products Company

24A KIANGSE ROAD, SHANGHAI

Chosen (Korean) Railway



FUSAN STATION

TO KEIJO

From Tokyo	45	hours	
,, Mukden	20	,,	
,, Harbin	33	,,	
,, Moscow	9	days	
,, Berlin	10	,,	
,, Paris and ,, London	11	,,	



SHINGISHU STATION

THE CHOSEN (KOREAN) RAILWAY

The Chosen Railway affords the travellers every opportunity to study the conditions and country of Chosen in addition to the enjoyment of interesting sights and scenes along the routes.

Express Trains

FUSAN-CHANGCHUN

Chosen-Manchuria Express Service

(944 miles, 33 hours)

The Chosen-Manchuria Express Train which takes excellently equipped sleeping, dining and 1st class cars is run thrice a week between the two points in connection with trains for Europe via the Changchun-Harbin Section of the Chinese Eastern Railway.



A STREET IN SEOUL

Express Trains

FUSAN-ANTUNG

(584 miles, 21 hours)

Through express trains to which cars of all classes (1st, 2nd and 3rd) and sleeping cars for 1st class passengers only are attached, are run once a day in each direction. European meals are obtainable on the trains.

FUSAN-KEIJO (SEOUL)

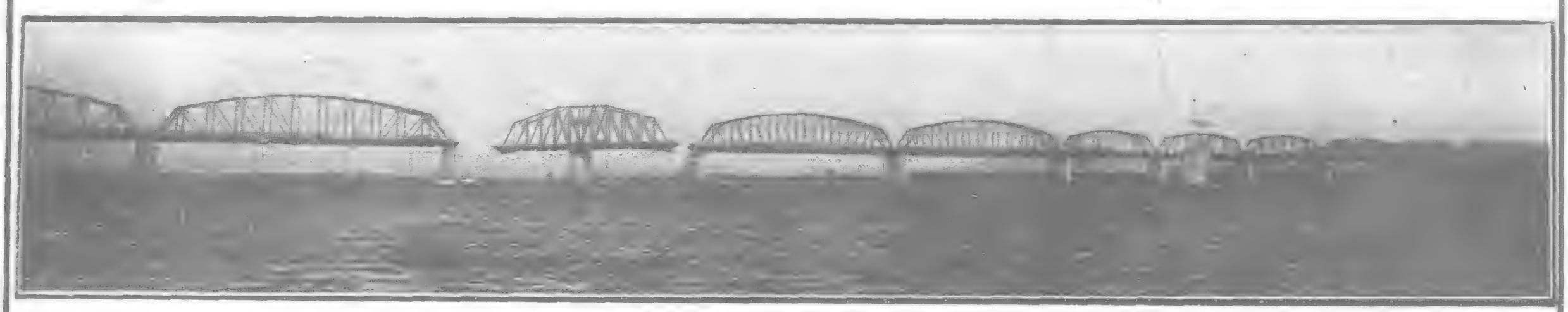
(275 miles, 11 hours)

Express trains for which passengers of all classes are booked and dining cars are provided, are run once a day from each end.

The Shortest Sea Route on a Overland Journey between Europe and Japan.—(Only 120 nautical miles, about 10 hours). The ferry service between Fusan and Shimonoseki is maintained twice a day by the Imperial Japanese Government Railways' steamers fitted with every up-to-date appliance for the comfort and safety of tourists.

Station Hotels.—At Fusan and Shingishu, the two terminii of the Chosen Railways, modern European station hotels are provided for the benefit of tourists.

Ticket Agencies.—The International Sleeping Car & Express Trains Company and Messrs. Thos. Cook & Son.



THE RAILWAY BRIDGE OVER THE YALU RIVER

The Railway Bureau of the Government-General of Chosen

RYUZAN, CHOSEN (KOREA)

American Car & Foundry Company

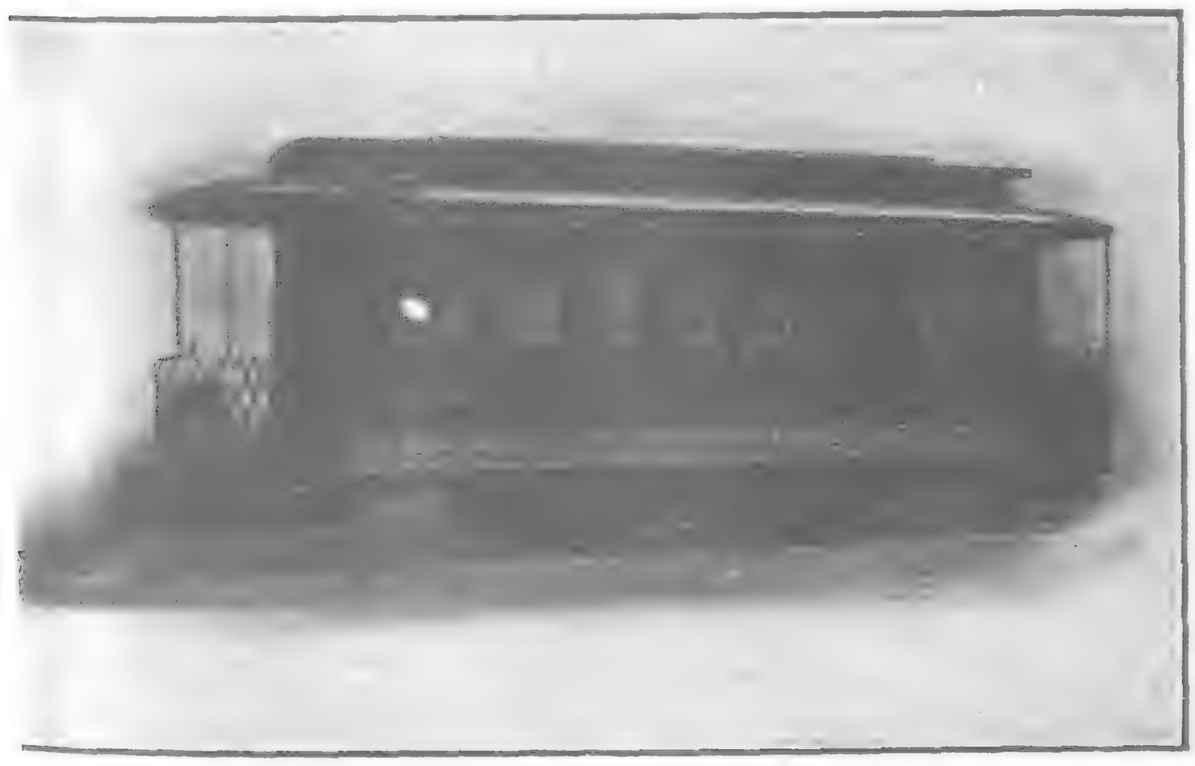
GENERAL OFFICES
CHICAGO 165 BROADWAY ST. LOUIS
NEW YORK

CAR BUILDERS

OUTPUT { 150,000 FREIGHT CARS
1,500 PASSENGER CARS
2,000,000 CAR WHEELS } PER ANNUM



HIGH SPEED INTERURBAN ELECTRIC CAR
Gauge 4'-8½" (1.435 M.); Body Length 46'-6" (14.173 M.); Capacity 58 Persons; Weight 75,400 lbs. (34,300 K.)





OPEN PLATFORM CONVERTIBLE MOTOR CAR
Gauge 4'-8½" (1.435 M.); Body Length 21'-4" (6.502 M.); Capacity 32 Persons; Over Platforms 29'-4" (8.940 M.); Weight 16,000 lbs. 7,300 K.)

Export Representative

DUTILH-SMITH, McMILLAN & COMPANY

165 BROADWAY NEW YORK

CHINESE GOVERNMENT RAILWAYS

THE TAO-CHING RAILWAY

TAOKOU TO CHINGHUA

(CHINESE GOVERNMENT HONAN LINE)



GENERAL VIEW OF COAL MINES ON THE LINE OF THE TAO-CHING RAILWAY

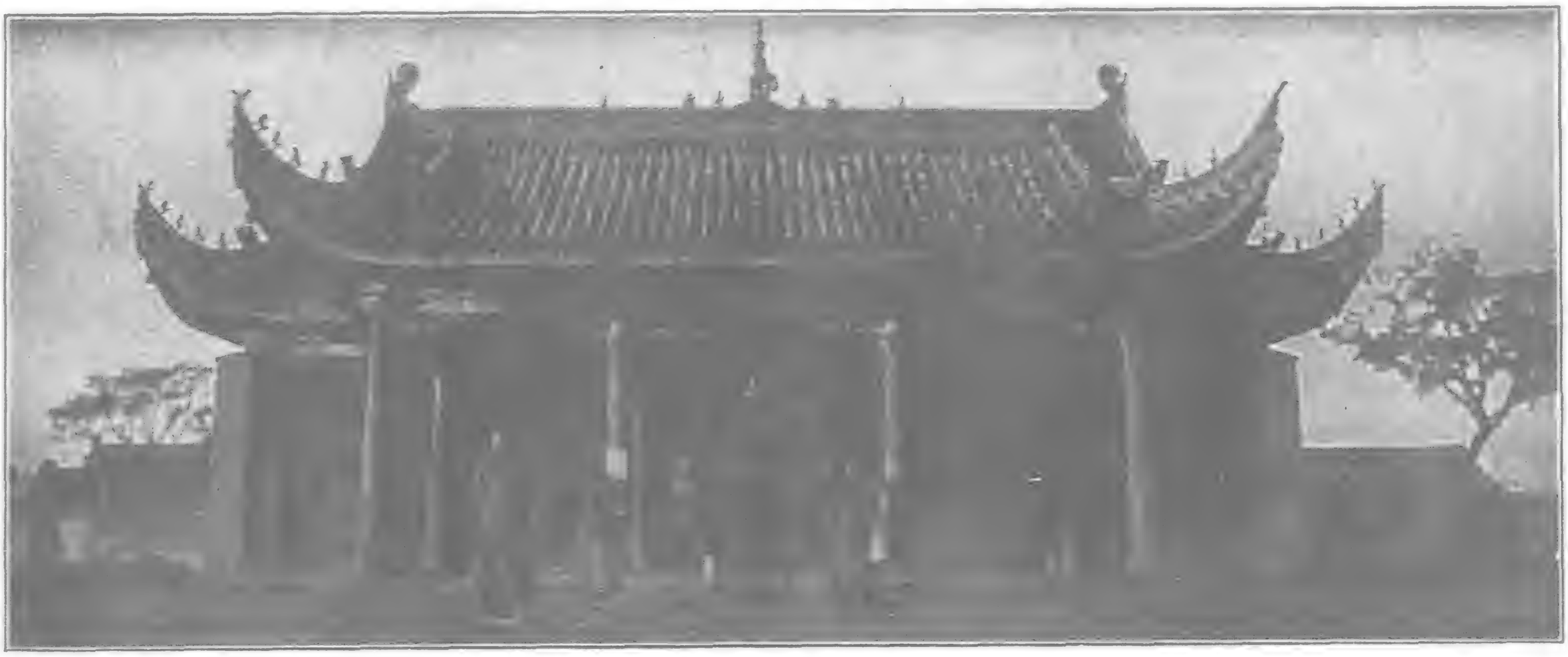
"China's Road of Anthracite"

THE TRAINS OF THIS LINE CONNECT AT SIN-SIANG-SIEN WITH THE THROUGH SERVICE OF THE PEKING-HANKOW RAILWAY. IT TAPS THE GREAT ANTHRACITE COAL DEPOSITS OF SHANSI, AND CONVEYS THE PRODUCTS OF THE MINES TO THE NEAREST NAVIGABLE RIVER.

THE PIENLO RAILWAY

(KAIFENG-FU TO HONAN-FU)

"THE FIRST SECTION OF THE PROJECTED CENTRAL TRUNKLINE"



CHUNG-HUAN TEMPLE, KAIFENG-FU.

The line connects with the through service of the Peking-Hankow Railway at Tcheng Tchéou, enabling the traveller to visit Kaifengfu, the provincial capital of Honan, and the old capital of the Empire at Honanfu.

Lima Locomotives

We Manufacture all Type and Sizes of Rod Locomotives as well as the Shay Geared

THE CUTS SHOWN BELOW, ILLUSTRATE LOCOMOTIVES RECENTLY CONSTRUCTED AT OUR PLANT.



One of 15-20 × 26" 0-6-0-8 Switcher Type Locomotives recently furnished for the Southern Railway.

63" E. W. T. Boiler.
185 Pound-Pressure.
51" Drivers.
32,063 Pounds Tractive Power.
4,500 Gallon-Tender.



One of 3-100 ton Shay Geared Locomotives built for Chinese Government Peking Kalgan Railway, Peking, China.

60 3/8" E. W. T. Boiler.
200 Pound-Pressure.
3-15 × "17" Cylinders.
44,100 Pounds Tractive Power.

Our plant has recently been equipped with the latest and most improved machinery, which enables us to build any type or size direct connected locomotives, that your requirements may demand. We also build the well-known Shay Geared Locomotive in 18 different sizes, ranging in weight from the 10-ton up to 150-tons.

Write our agents or New York office for any information you may desire in this line, and for copy of catalog B.

LIMA LOCOMOTIVE CORPORATION

1096 SOUTH MAIN STREET LIMA, OHIO, U.S.A.

AGENTS
SHEWAN-TOMES & CO..
HONGKONG, CANTON, SHANGHAI, TIENTSIN, CHINA

BRANCH OFFICE
50 CHURCH STREET, NEW YORK, N. Y.
CABLE ADDRESS
SHAYLOCO

AGENTS
SAMUEL, SAMUEL & CO.,
YOKOHAMA. TOKYO, KOBE, SHIMONOSEKI, JAPAN, TAIPEH, FORMOSA



Telegrams: "Activity."

Western Valleys Anthracite Co.,

SWANSEA AND LLANELLY.

Producers of specially prepared

ANTHRACITE FOR GAS PRODUCER PLANTS.

CLEEVES & CO.,

ANTHRACITE PROPRIETORS, 23, LIME ST., LONDON.

Code: A.B.C. 5th Edition. Telegrams: "Nudicaul."

中華民國政府吉長鐵路行車時刻表

CHINESE GOVERNMENT RAILWAYS

KIRIN-CHANG CHUN LINE



CHINESE MARKET AT CHANG-CHUN



VIEW OF KIRIN FROM THE SUNGARI RIVER

TIME TABLE OF PASSENGER, GOODS AND CONSTRUCTION TRAINS

下行車次數 NUMBER OF DOWN TRAINS

站名 Name of Station				No. 1	No. 3	No. 5	No. 7	No. 9
頭	道	溝	arr.					
T.	T.	K.	dept.	8.30	18.15			
長		春	arr.	8.45	18.30			
C.		C.	dept.	9.00		3.30	6.00	9.30
安	龍	泉	arr.	pass		pass	pass	pass
A.	L.	C.	dept.	9.10		3.45	6.15	9.45
卡		倫	arr.	9.35		pass	pass	10.15
K.		L.	dept.	9.40		4.15	6.45	10.20
飲	馬	河	arr.	10.15		4.55	7.25	11.00 No. 6
Y.	M.	H.	dept.	10.25		5.05	7.35	11.05
下	九	台	arr.	10.40 No. 6		pass	pass	11.22
H.	C.	J.	dept.	10.42		5.23	7.55	11.25
營	城	子	arr.	10.55		pass	pass	11.40
Y.	C.	J.	dept.	11.00		5.38	8.10	11.50
馬	鞍	山	arr.	11.13		5.53	8.25	12.05 No. 8
M.	A.	S.	dept.	11.15		6.00	8.30	12.10
土	門	嶺	arr.	11.35 No. 8		6.25	8.55 No. 6	12.35
T.	M.	L.	dept.	11.45		6.35	9.02	12.45
樺	皮	廠	arr.	12.40		7.35	10.00	13.45 No. 2
H.	P.	C.	dept.					

上行車次數 NUMBER OF UP TRAINS

站名 Name of Station				No. 2	No. 4	No. 6	No. 8	No. 10
樺	皮	廠	arr.					
H.	P.	C.	dept.	13.50 No. 9		8.00	10.30	14.10
土	門	嶺	arr.	14.50		9.00 No. 7	11.30 No. 1	15.10
T.	M.	L.	dept.	15.00		9.05	11.47	15.20
馬	鞍	山	arr.	15.13		9.25	12.07 No. 9	15.35
M.	A.	S.	dept	15.15		9.30	12.12	15.45
營	城	子	arr.	15.28		pass	pass	16.00
Y.	C.	J.	dept.	15.33		10.05	12.27	16.05
下	九	台	arr.	15.46		10.35 No. 1	pass	16.20
H.	C.	J.	dept.	15.48		10.43	12.42	16.22
飲	馬	河	arr.	16.03		11.01 No. 9	12.59	16.40
Y.	M.	H.	dept.	16.13		11.10	13.07	16.50
卡		倫	arr.	16.53		pass	pass	17.35
K.		L.	dept.	16.58		11.55	13.52	17.40
安	龍	泉	arr.	pass		pass	pass	pass
A.	L.	C.	dept.	17.23		12.25	14.22	18.10
長		春	arr.	17.33		12.40	15.37	18.25
C.		C.	dept.	17.45	8.00			
頭	道	溝	arr.	18.00	8.15			
T.	T.	K.	dept.					

Nos. 1, 2, 3 and 4 are passenger trains. 第一, 二, 三, 四次係客車
,, 9 and 10 ,, goods ,, 第九, 十次係貨車
,, 5, 6, 7 and 8 ,, construction ,, 第五, 六, 七, 八次係工程車

Traffic Manager.

Pacific Type Locomotives



PACIFIC TYPE LOCOMOTIVE WITH SUPERHEATER, CHICAGO & EASTERN ILLINOIS R. R.

Cylinders, 26½″×28″
Driving wheels, 73″ diam.
Steam pressure, 180 lbs.
Weight on driving wheels, 165,150 lbs.
Weight, total engine, 261,600 lbs.
Tractive force, 41,200 lbs.

The Pacific type has a four-wheeled leading truck, three pairs of driving wheels and a two-wheeled trailing truck, and is thus a development of the Atlantic type which was illustrated last month. Pacific type locomotives combine ample weight on driving wheels with high steaming capacity, and are suitable for heavy, fast passenger service. They are also well adapted to fast freight service on lines having moderate grades.

The heaviest passenger trains in the United States weigh from 600 to 800 tons exclusive of engine and tender, and such trains are being successfully handled by large Pacific type locomotives. Many of these locomotives are equipped with superheaters, and are making excellent records for fuel economy. The locomotive illustrated above is fitted with a Schmidt superheater, and a brick arch in the furnace, and is representative of the latest development of this class of engine.

Agents for China:—ARNHOLD, KARBERG & Co., SHANGHAI, TIENTSIN, HONGKONG and HANKOW
Agents for Japan:—SALE & FRAZAR, Ltd., TOKYO.

THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA, PA., U.S.A.
Cable Address:—"BALDWIN PHILADELPHIA"

MANILA RAILROAD COMPANY

THE PIONEER RAILWAY ENTERPRISE IN THE PHILIPPINES

BAGUIO

172 MILES NORTH OF MANILA



DELIGHTFUL MOUNTAIN AIR—PURE WATER

WINTER AND SPRING COMBINED

ALTITUDE 5400 FEET

THE GREAT HEALTH AND PLEASURE RESORT OF THE PHILIPPINES

Manila to the Mountains in 9 hours

Baguio, the famous **Summer Capital and Health Resort** in the picturesque Benguet Mountains, **5000 feet above sea level.**

Pure, Fresh air; cool, bracing and invigorating climate.



STRIKING PORTION OF THE BENGUET ROAD ON THE WAY TO BAGUIO

SEE BAGUIO AMONG THE PINES

Only 9 hours run from Manila by a Railroad and Government Automobiles.

Special low Season Rates from March 31st until July 1st.

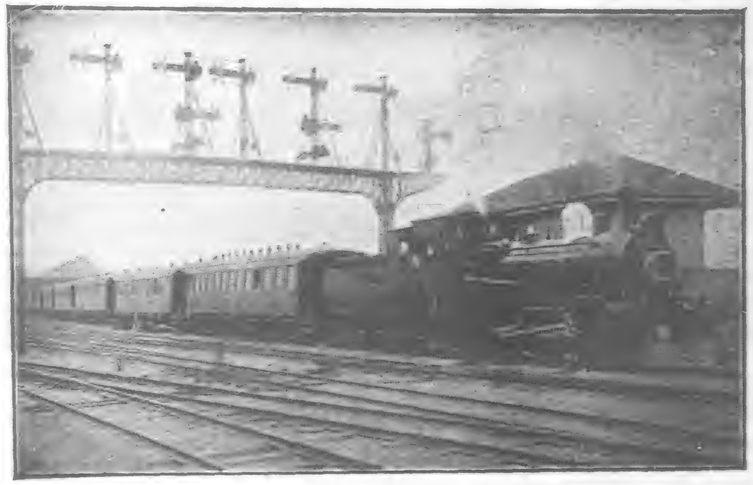
Express day and night trains, leaving Manila on Tuesday and Thursday at 7:56 a.m., and night trains on Fridays at 10:00 p.m.

Day service: Round Trip Tickets to Baguio, including Automobiles, P27.90 first class; P23.00 second class; P11.00 third class.

Night service: Round Trip, including Automobiles and sleeping accommodation on train, P38.50 first class; P15.00 third class.

BAGUIO IS SO BRACING

The Mountain Region of North Luzon With Its Temperate Climate is Becoming the Leading Health Resort of the Far East.





TAAL, AS SEEN FROM THE MAINLAND

TAAL VOLCANO

Three Hours from Manila to Center of Beautiful Volcanic Region of Luzon.

OFFICE

255 Azcarraga, Tondo, Manila

H. L. HIGGINS,

President and Engineer-in-Chief

Chinese Government Railways

The Cheng-Tai Railway

(CHINESE GOVERNMENT SHANSI LINE—CHENGTINGFU TO TAIYUANFU)



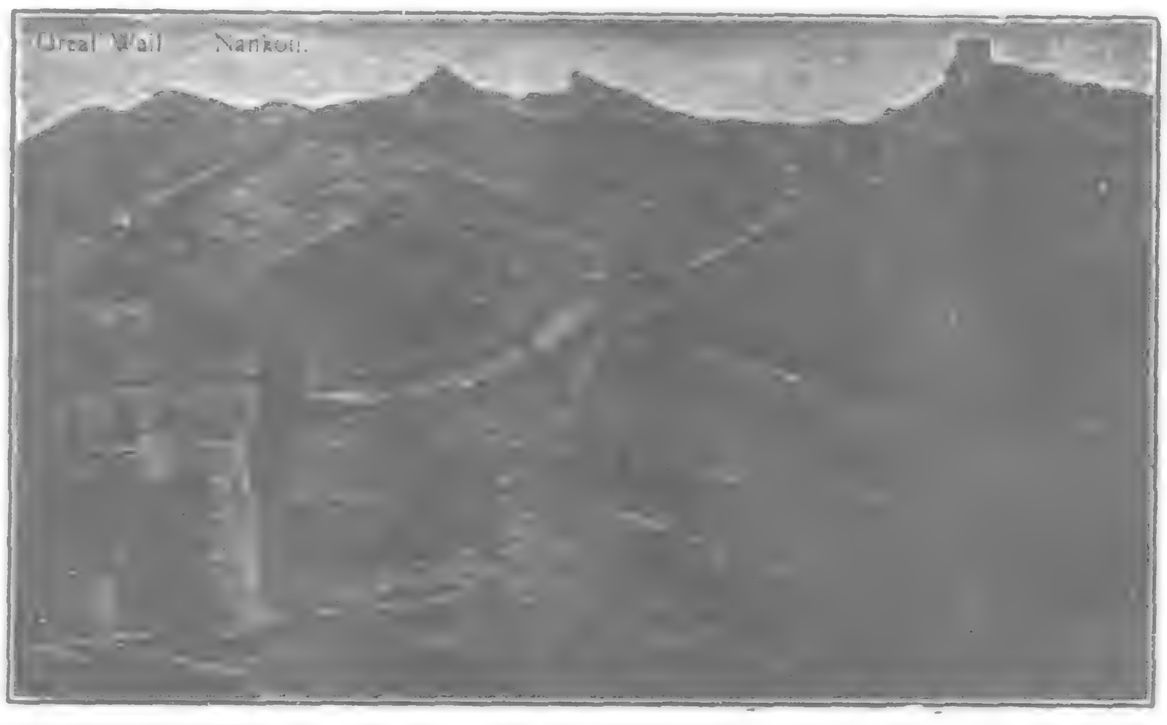
VIEWS ALONG ROUTE OF CHENG-TAI RAILWAY

The trains of this line connect with the through service of the Peking-Hankow Railway, affording Travellers the opportunity of seeing the most picturesque part of China. The line passes through a mountainous section of country, rich in Mineral Resources to the Provincial Capital of Shansi at Taiyuanfu. This interesting city is a great educational center, and famous for the fine quality of its artistic embroideries.

The Peking-Kalgan Line

"THE ROAD TO THE GREAT WALL"



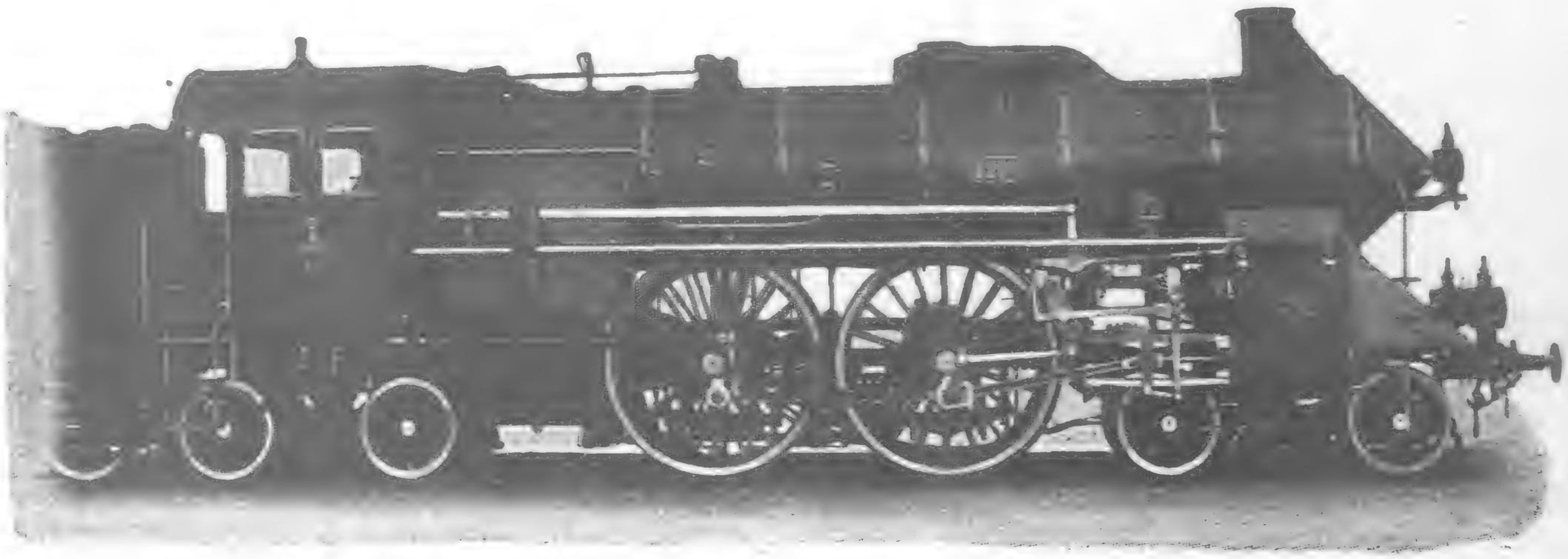


This line follows the ancient caravan route and military highway from Mongolia into China by the way of the historic Nankow Pass. This pass is the Key to Peking, and Kalgan is the gate of the Country. From here the great camel caravans set out on their long journeys across Mongolia to Siberia and Central Asia. This old frontier mart, retaining its time-honored characteristics, one of the most interesting sights of the Old World, is made accessible by the new railway. The line also carries the passenger in two hours from Peking to Nankow, when the Great Wall of China and the Ming Tombs may be seen. A foreign hotel is operated by the railway authorities at Nankow, where chairs and guides may be secured for the Tombs.

J. A. MAFFEI,

MUNICH

GERMANY.



LOKOMOTIVES OF ALL TYPES

AND FOR ALL GAUGES.

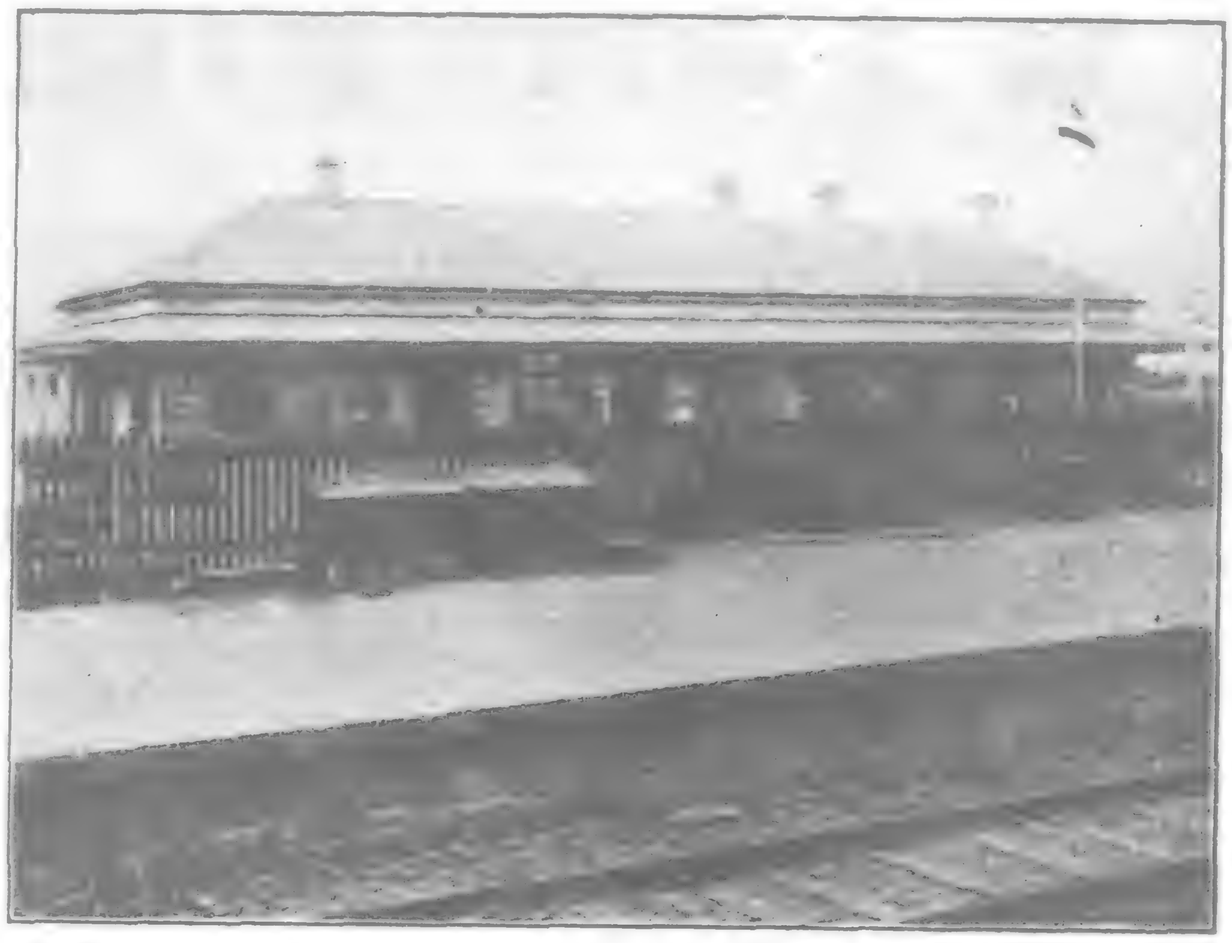
CHINESE GOVERNMENT RAILWAYS

TIENTSIN-PUKOW LINE

Express Passenger Train Service



STATION AT LIU HUAI KUAN TIENTSIN-PUKOW RAILWAY.



BRITISH OR SOUTHERN SECTION STATION AT PENG-PU

Notice is hereby given that through express service of first, second and third classes with dining and sleeping cars from Tientsin to Pukow has been inaugurated on December 4th, 1912, and until further notice. These trains will leave Pukow on Mondays and Fridays, and Tientsin, on Wednesdays and Saturdays, stopping only at the principal stations en route.

Departure			*Arrival*		
Monday / Friday	Pukow	9.00 A.M.	Tuesday / Saturday	Tientsin	11.07 A.M.
Wednesday / Saturday	Tientsin	1.00 P.M.	Thursday / Sunday	Pukow	3.15 P.M.

Detailed Time Table will be found hereafter in the back pages of this paper.

EXPRESS FARE TABLES

	PUKOW-HSUCHOWFU	HSUCHOWFU-TSINANFU	TSINANFU-TIENTSIN
1st class	$13.90	$13.60	$14.60
2nd ,,	9.30	9.05	9.70
3rd ,,	4.65	4.50	4.90

LUGGAGE ALLOWANCE

1st class, 150 catties; 2nd class, 100 catties; 3rd class, 50 catties.

Excess luggage is charged at one (1) cent per picul per mile on the express trains and half a cent on ordinary trains.

Only first class passengers are entitled to book sleeping berths, at $5.00 per berth.

The Railway ferry steam-launch, lying at the jetty above the Japanese Hulk, will carry passengers across the river forty minutes before the trains leave. Passengers may book their tickets at the office on the ferry jetty.

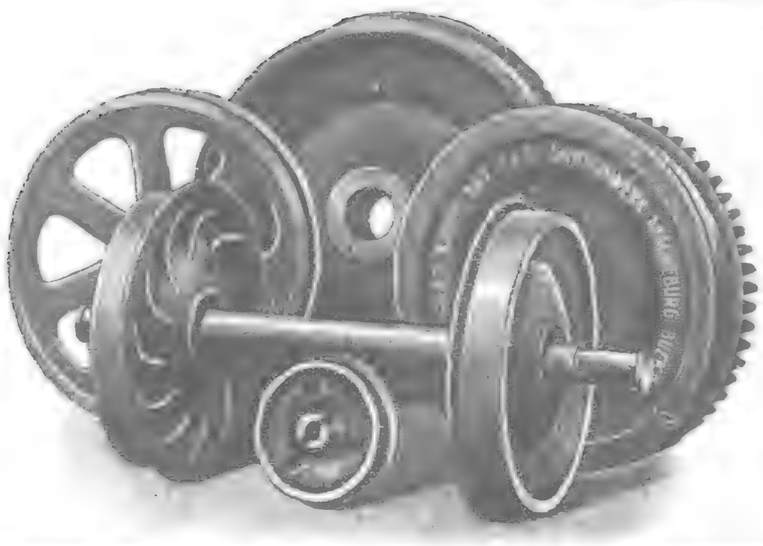
The ordinary trains running between Pukow-Hsuchowfu, Hsuchowfu-Tsinanfu, and Tsinanfu-Tientsin will continue as before. For time refer to the Time Table.

For further particulars, etc., apply to the Traffic Department at Tientsin or Head Office, Nanking.



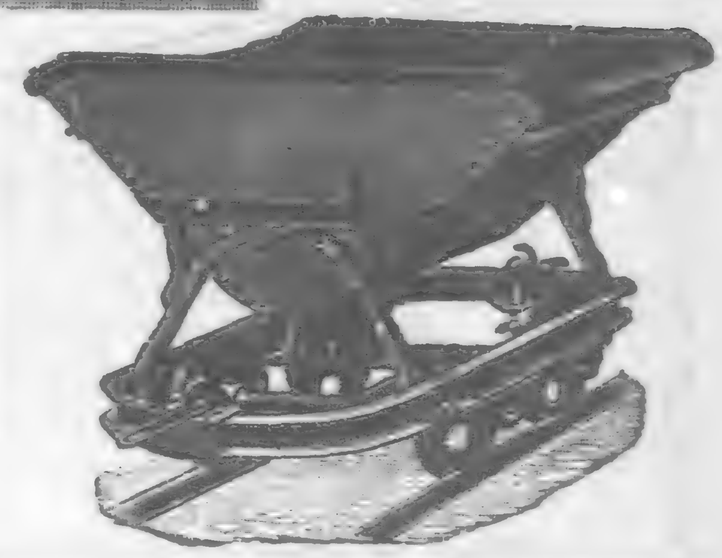
BALDWIN LOCOMOTIVES







RAILWAY EQUIPMENT



ARNHOLD, KARBERG & CO.

ENGINEERING AND ELECTRICAL DEPARTMENTS

LONDON—BERLIN—NEW YORK—PHILADELPHIA

Shanghai, Hongkong, Canton, Hankow, Chungking, Tientsin, Tsingtau, Tsinanfu, Newchwang, Peking.

Railways, Mines, Arsenals, Mints, Mills, Electric Light & Power Plants, Telephone Systems, Flour, Oil, Cotton and Woollen Mills, Industrial Plants For Any Purpose, Designed, Equipped and Erected

AGENTS FOR

ELECTRICAL GENERATORS. SUPPLIES, ETC.
Allgemeine Electricitaets Gesellschaft (A.E.G. Berlin.

ELECTRIC TRAIN LIGHTING
Electric Train Lighting Co., Berlin.

LIGHT RAILWAY MATERIAL
Orenstein & Koppel—Arthur Koppel, A.B.

STEAM LOCOMOTIVES
The Baldwin Locomotive Works, Philadelphia, Pa.

TELEPHONE APPARATUS
The Western Electric Co., New York and Chicago.

STEAM HAMMERS AND MACHINE TOOLS OF ALL DESCRIPTION FOR RAILWAYS AND ARSENALS
Niles-Bement-Pond Co., New York.

STEAM & COMPRESSED AIR DRILLING MACHINERY, PNEUMATIC TOOLS, ETC.
The Ingersoll-Rand Co., New York.

STEAM PUMPS
The A. S. Cameron Steam Pump Works, New York

REINFORCED CONCRETE MATERIALS (KAHN SYSTEM).
The Trussed Concrete Steel Co. Detroit. Mich.

BLASTING POWDER, FUSES, RACKAROCK.
The Rendrock Powder Co., New York.

BELTING
The Gandy Belting Co., Baltimore, Md.

ROOFING
The Paraffine Paint Co., San Francisco, Cal.

AUTOMATIC CAR COUPLERS, BOLSTERS, ETC.
The Gould Coupler Co., New York.

WELL DRILLING MACHINERY
Star Drilling Machine Co., Akron, Ohio.

BOILER STAY BOLT MATERIAL
The Falls Hollow Staybolt Co., Cuyahoga Falls, Ohio.

METALLIC PACKING AND LOCOMOTIVE SANDERS
The United States Metallic Packing Co., Philadelphia.

STAIR TREADS
The American Mason Safety Tread Co., New York.

MOTORS, TORPEDO AND MINING MATERIAL
Berliner Maschinenbau A. G. vorm Schwarzkoff, Berlin.

ENGINES, PUMPS, BOILERS, ICE MACHINES, ETC.
A. Borsig, Tegal, Berlin.

AMMUNITION, ETC.
Deutsche Waffen and Munitions Fabriken, Berlin, Karlsruhe.

ARMY RIFLES, ARMS, ETC.
Waffenfabrik Mauser A. G., Obendorf, Neckar.

GUNS AND AMMUNITION
Skodawerke A. G., Pilsen.

MACHINE TOOLS
Ludw. Loewe, A. G., Berlin.

WAR VESSELS
Stettiner Maschinenbau A. G. "Vulcan."

STEEL
Jonas & Colver, Ltd., Sheffield.

COTTON MILLING MACHINERY
Asa Lees & Co. Ltd, Oldham.

MOTOR BOATS
Carl Meissner, Hamburg

DIESEL ENGINES
Diesel Engine Co., Ltd., London

LUMBER
The China Import & Export Lumber Co.

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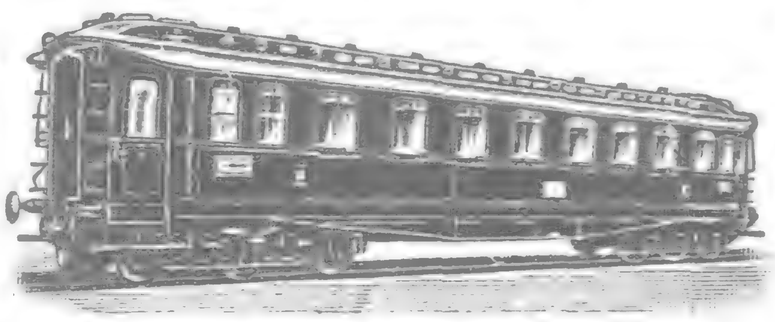
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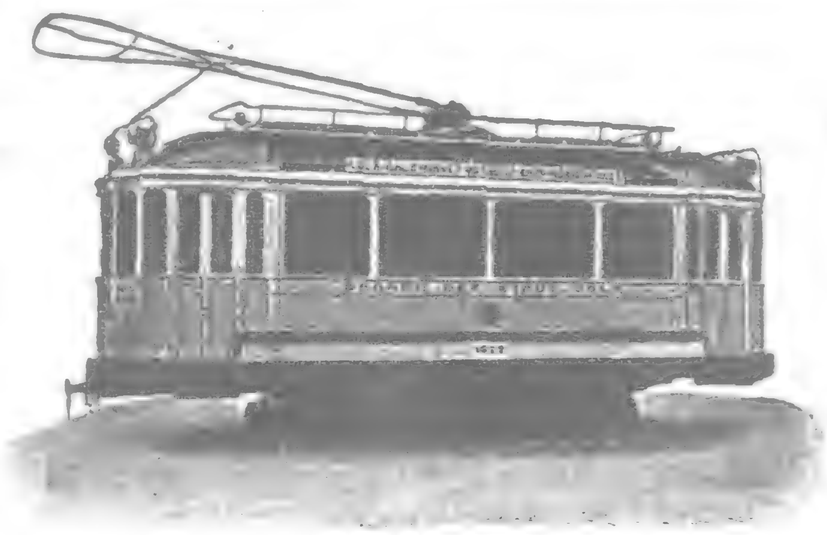
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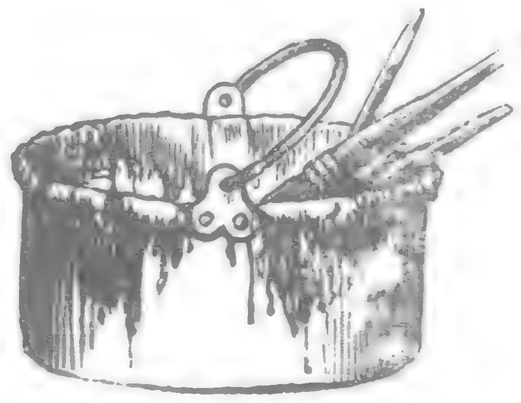
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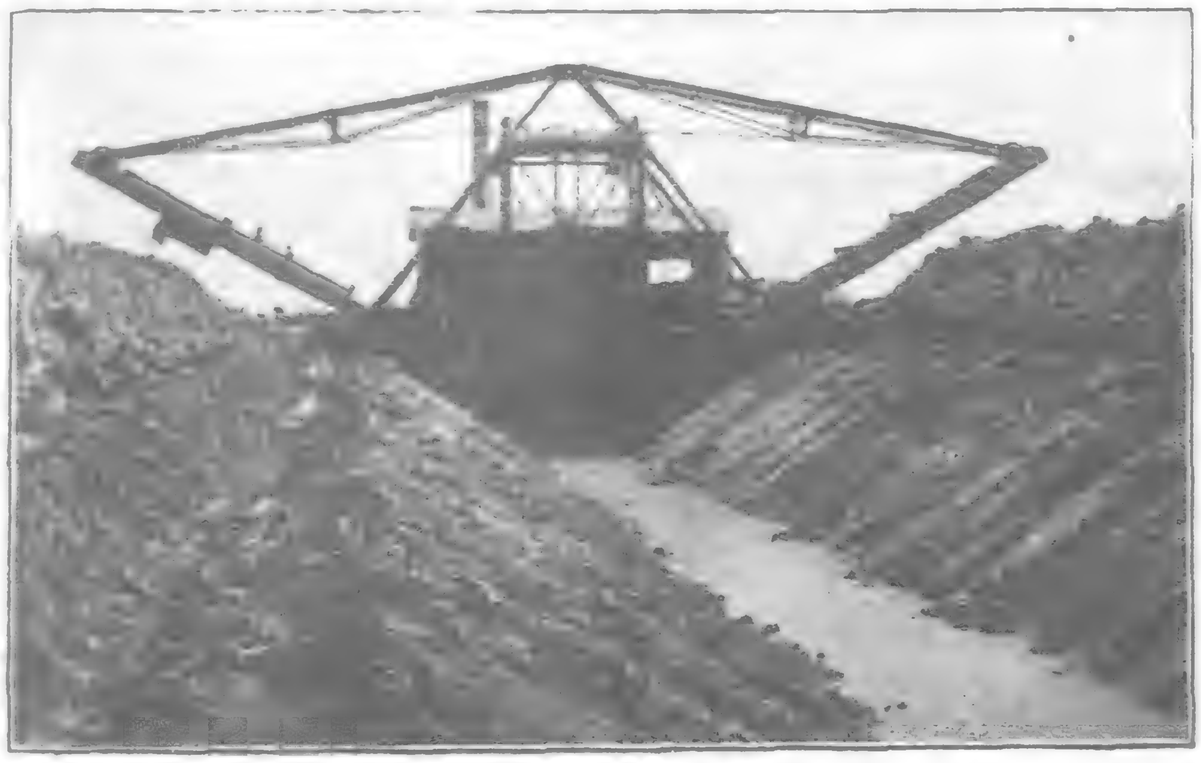
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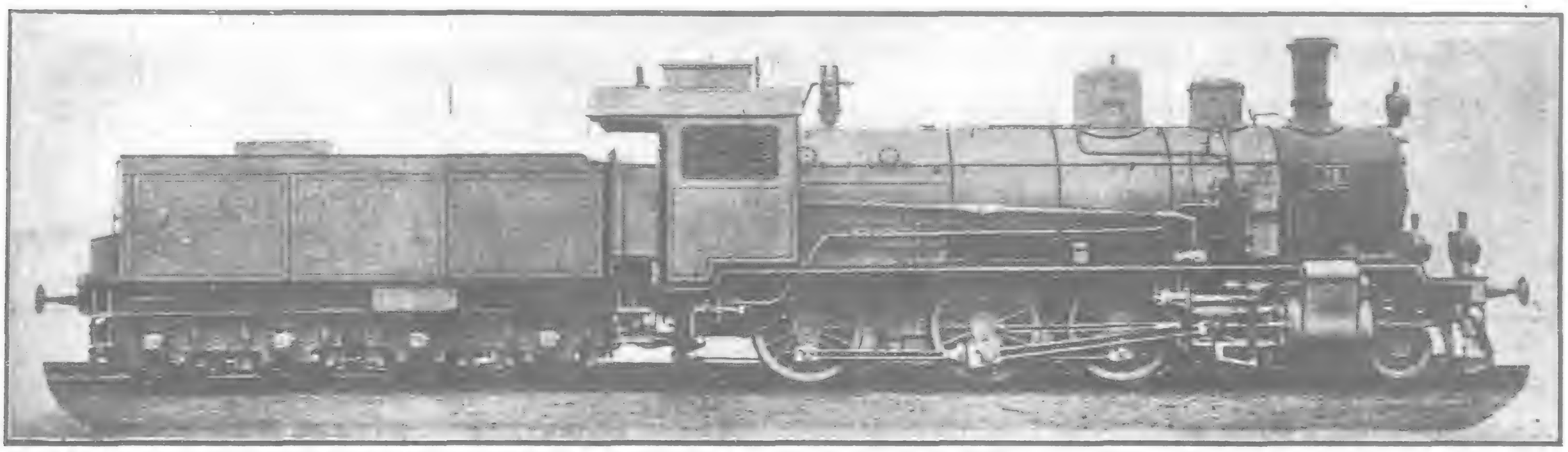
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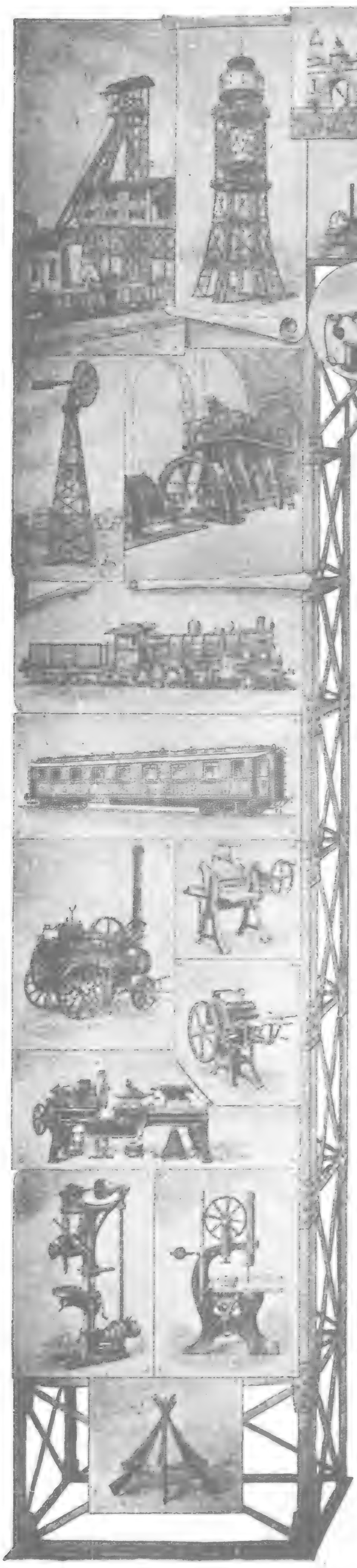
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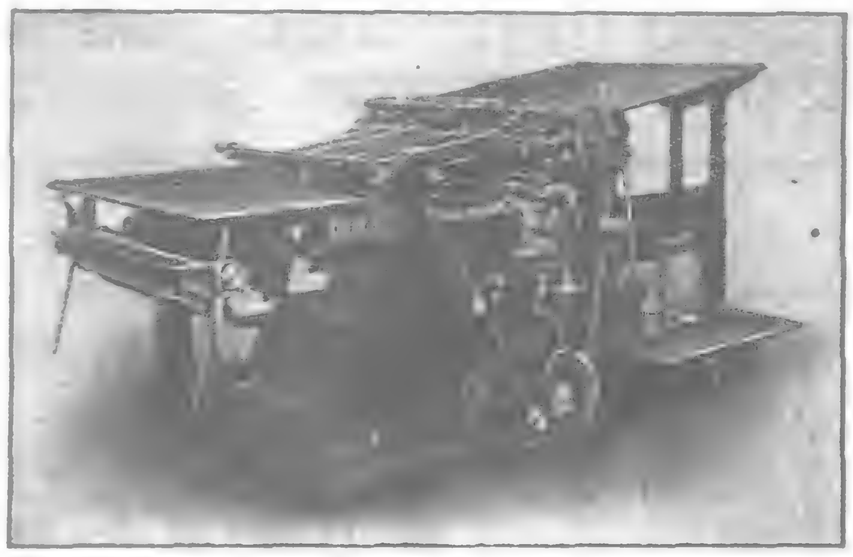
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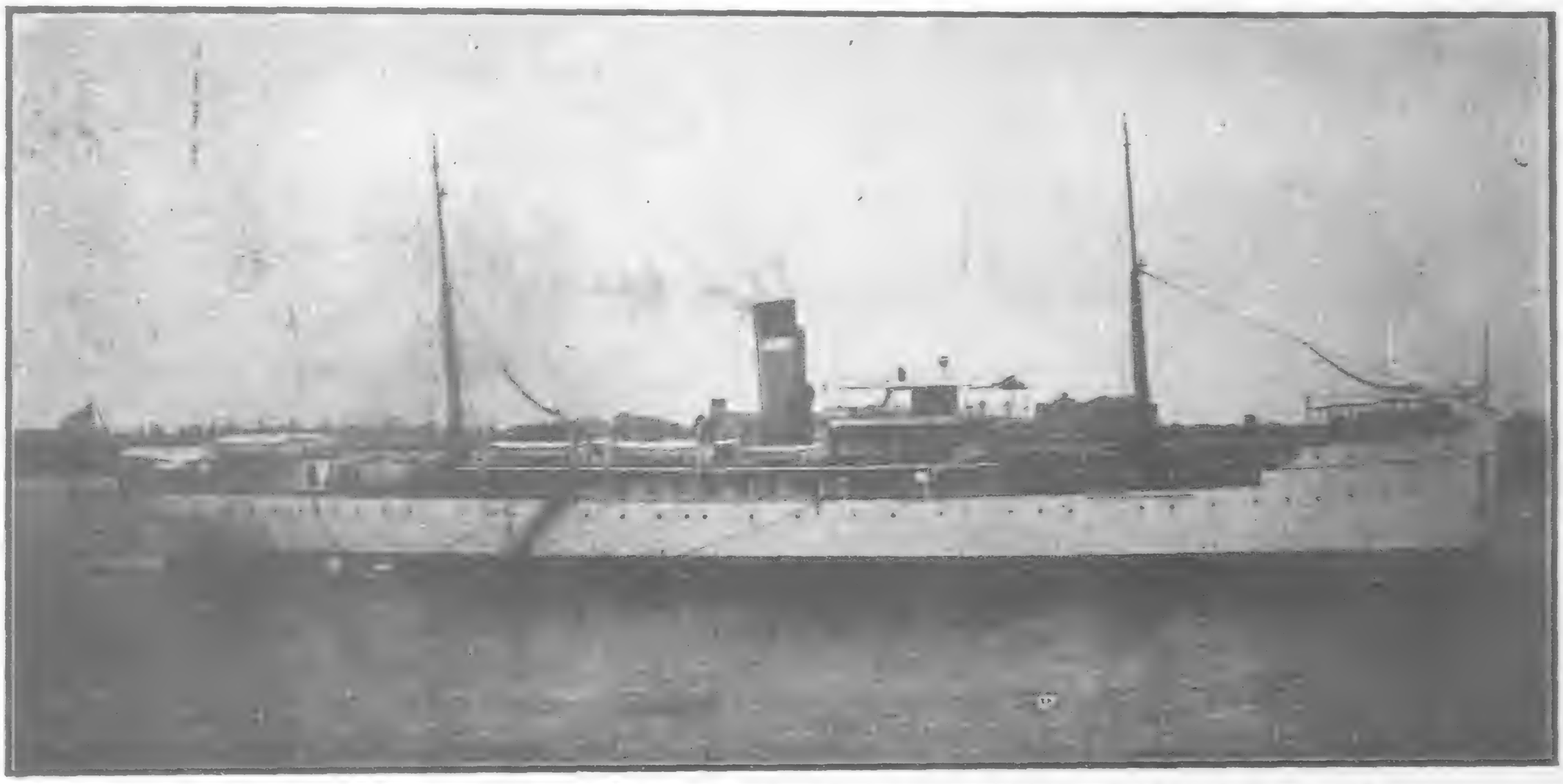
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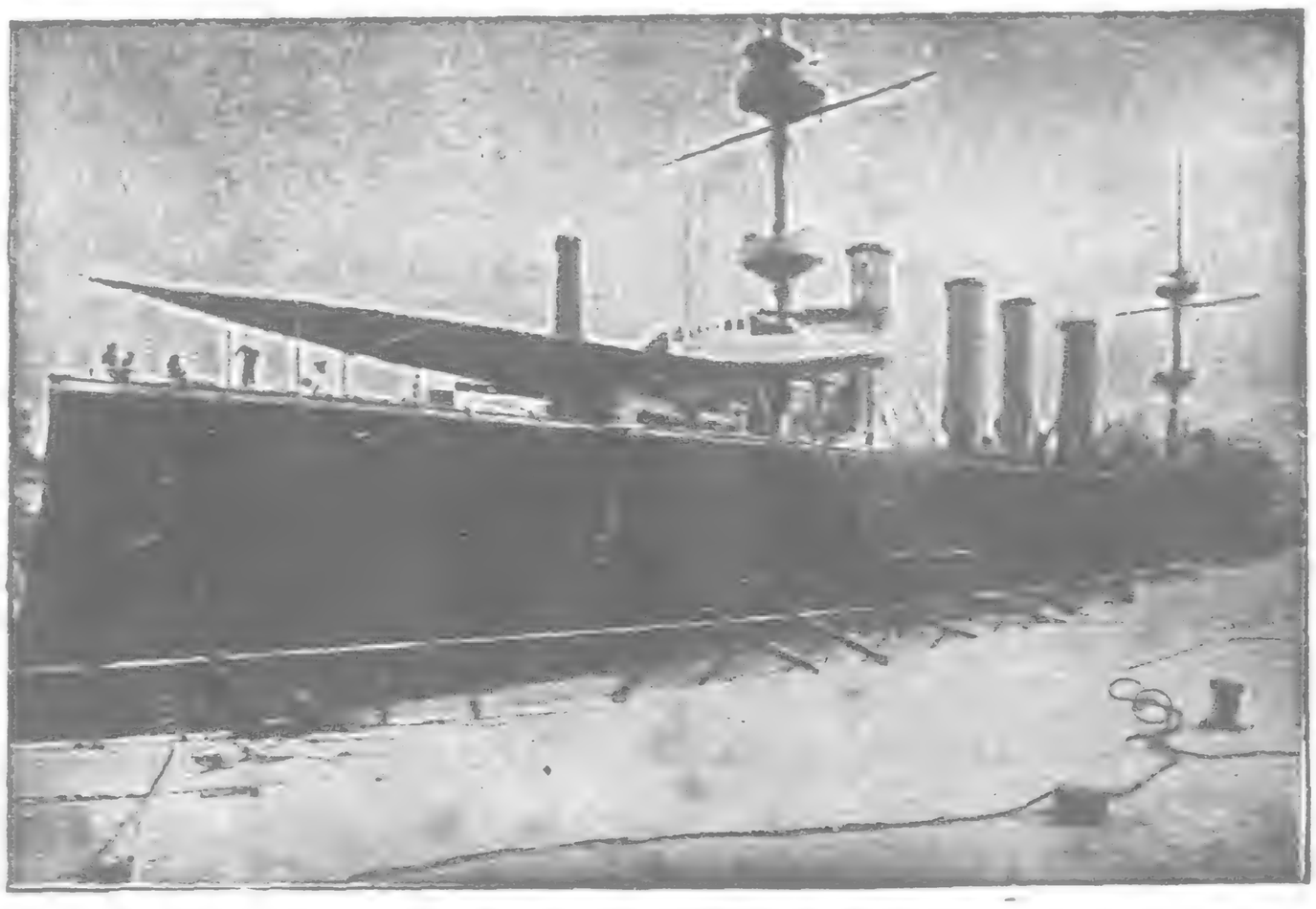
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Name of Dock or Slip	*Length on Keel Blocks*	*Entrance Breadth*	*Depth Over Sill at Ordinary Spring Tides*	*Rise of Tide*	
				Springs	*Neaps*
KOWLOON	*Feet*	*Feet*	*Feet*	*Feet*	*Feet*
No. 1 Dock, Kowloon	700	86 ft. top / 70 ft. bottom	30'	7' 6"	3
No. 2 Dock, Kowloon	371	74'	18' 6"	7' 6"	——
No. 3 Dock, Kowloon	264	49' 3"	14'	7' 6"	——
Patent Slip, No. 1, Kowloon	240	60'	14'	7' 6"	——
Patent Slip, No. 2, Kowloon	220	60'	12'	7' 6"	——
TAI-KOK-TSUI					
Cosmopolitan Dock	466	85' 6"	20'	7' 6"	——
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Hope Dock	430	84'	23'	7' 6"	——
Lamont Dock	333	64'	16'	7' 6"	——

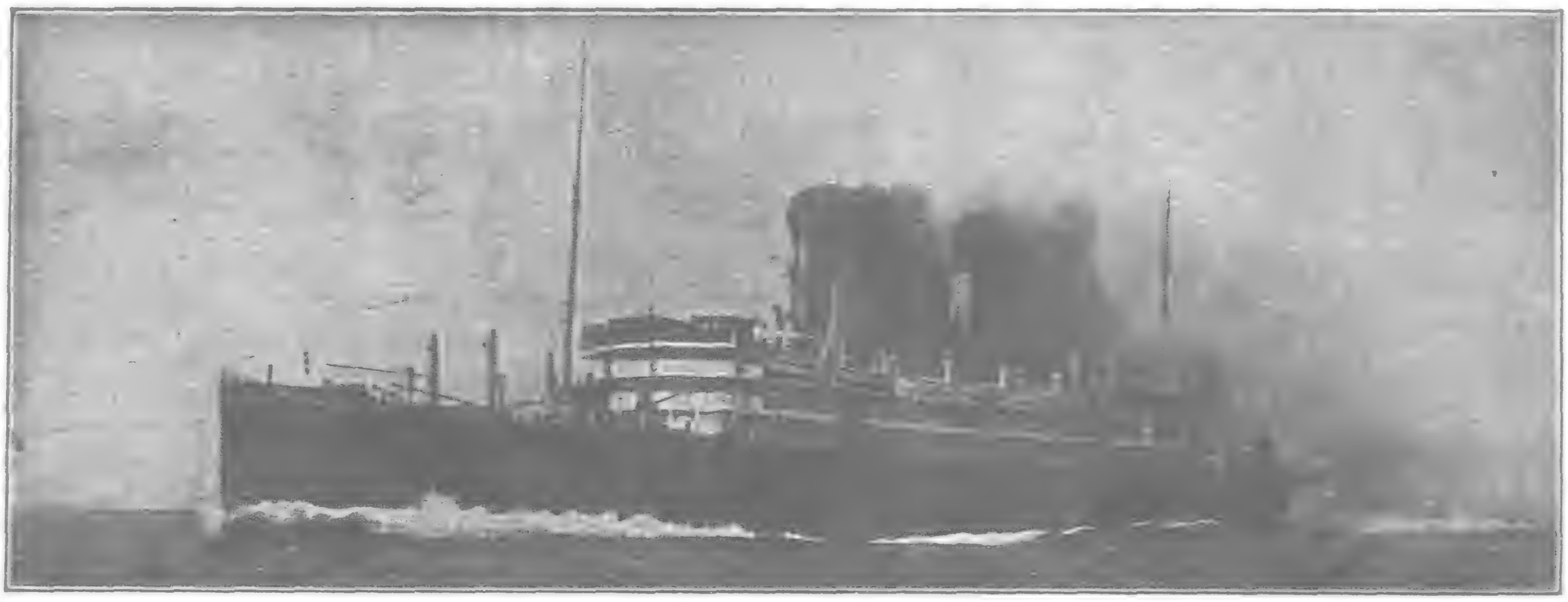
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Width of Entrance on top	88 "	Width of Entrance on top	66 "	Width of Entrance, top	99½ "
" " " " Bottom	77 "	" " " " Bottom.	53 "	" " " Bottom.	88½ "
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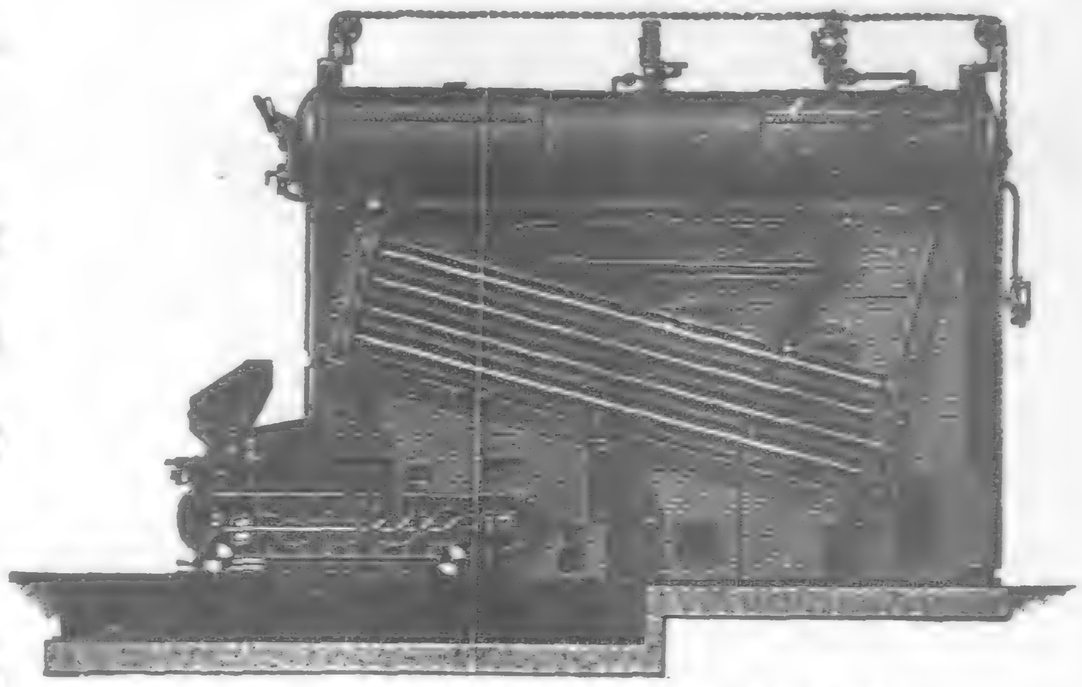
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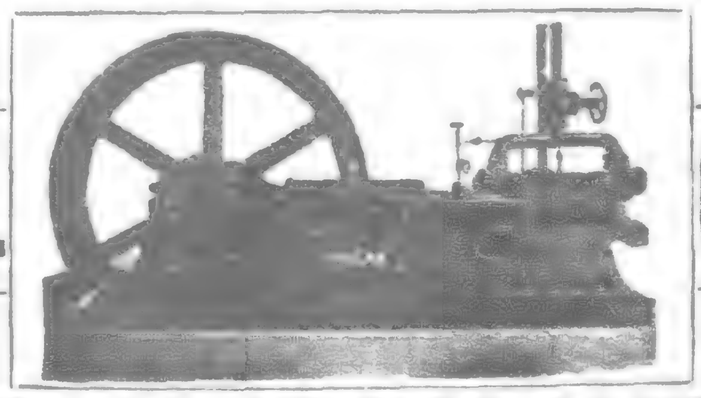
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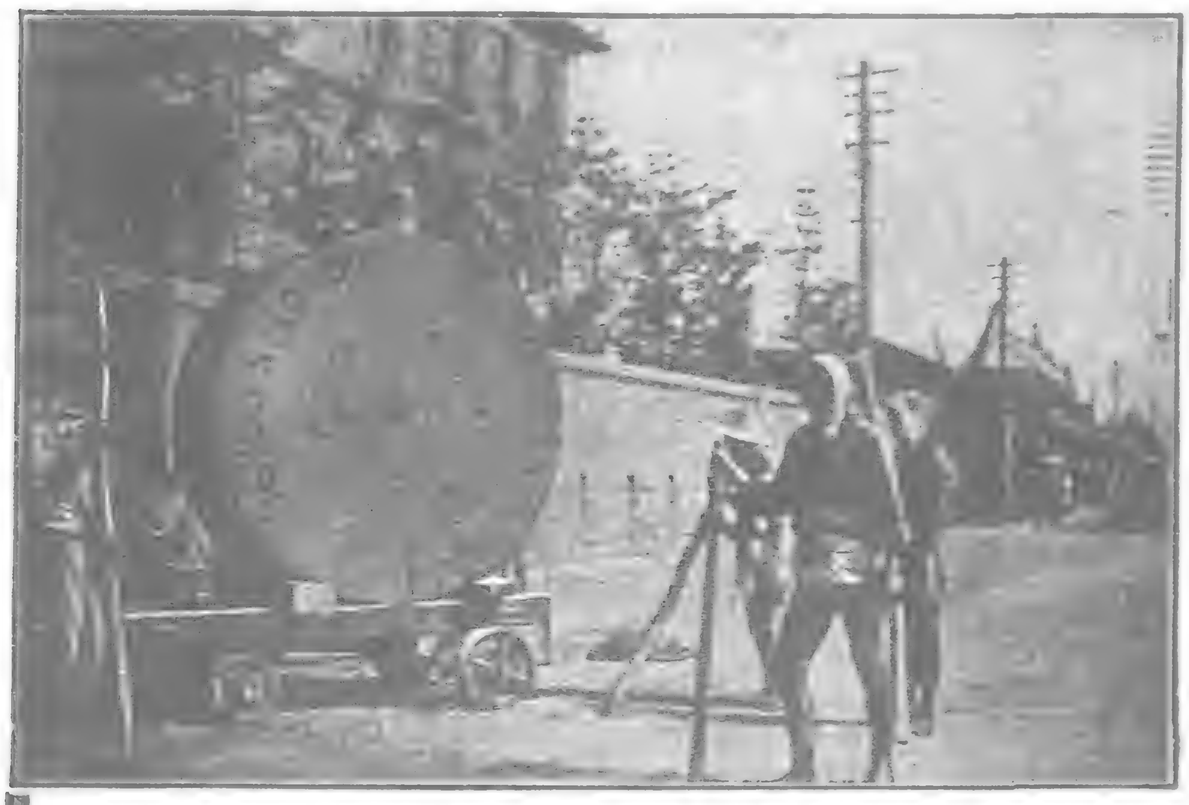
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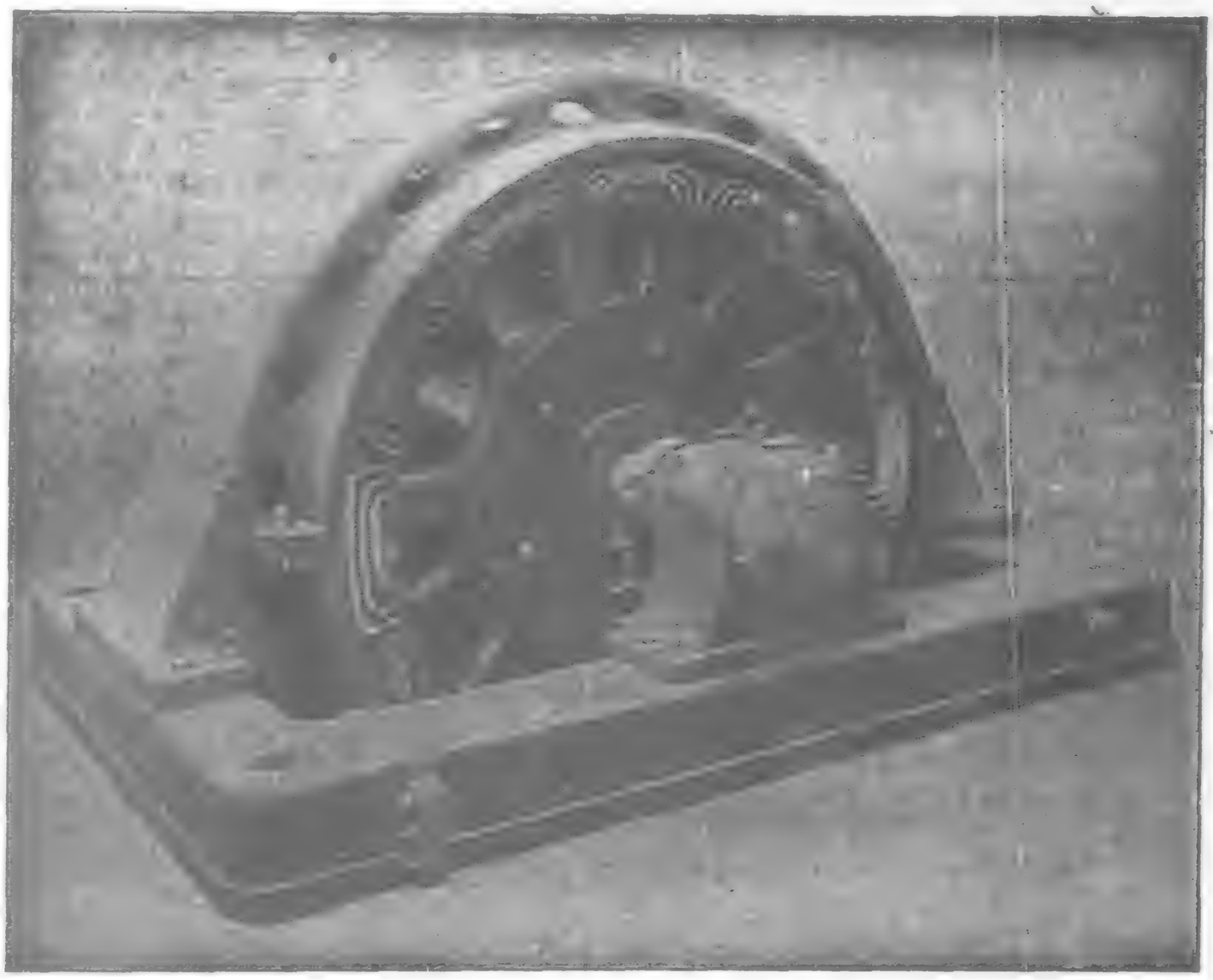
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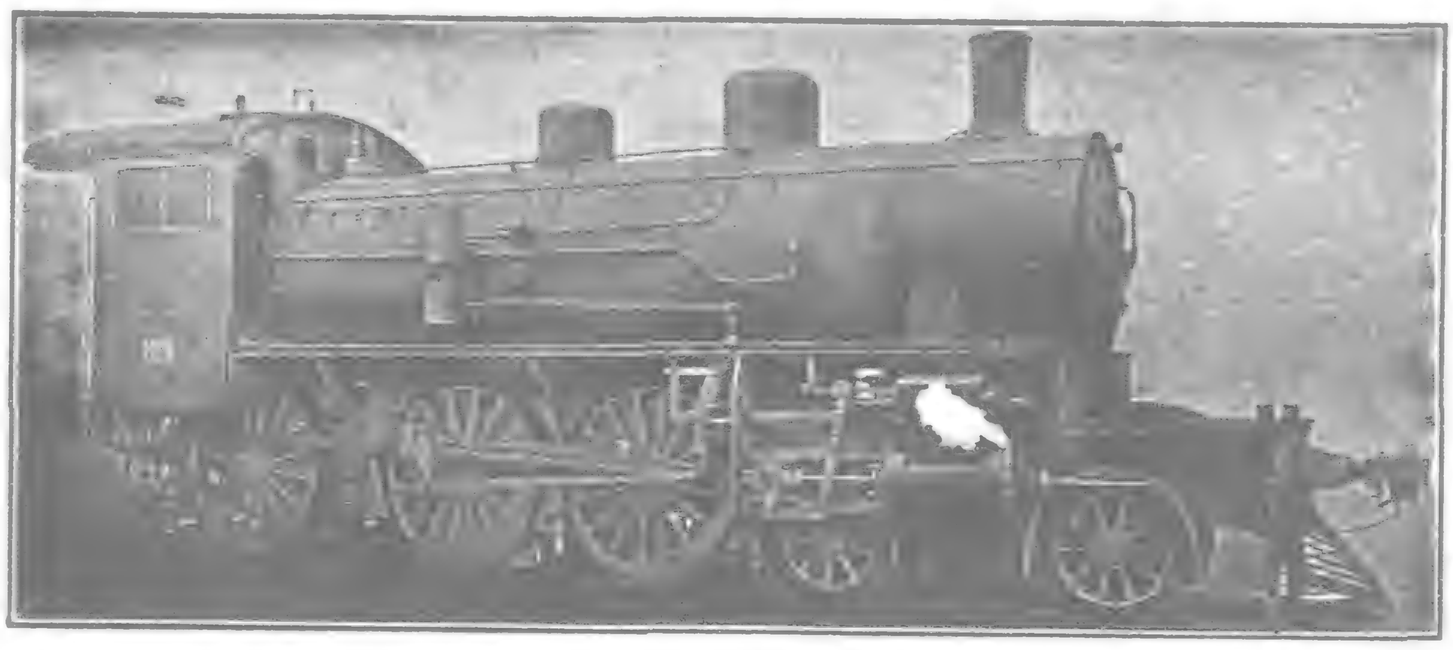
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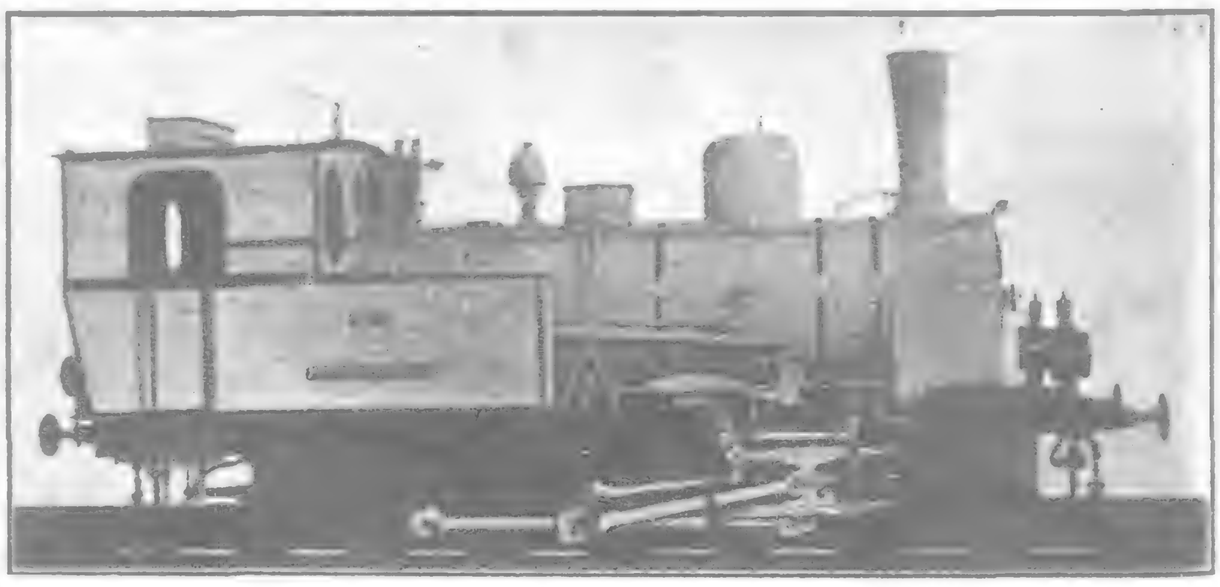
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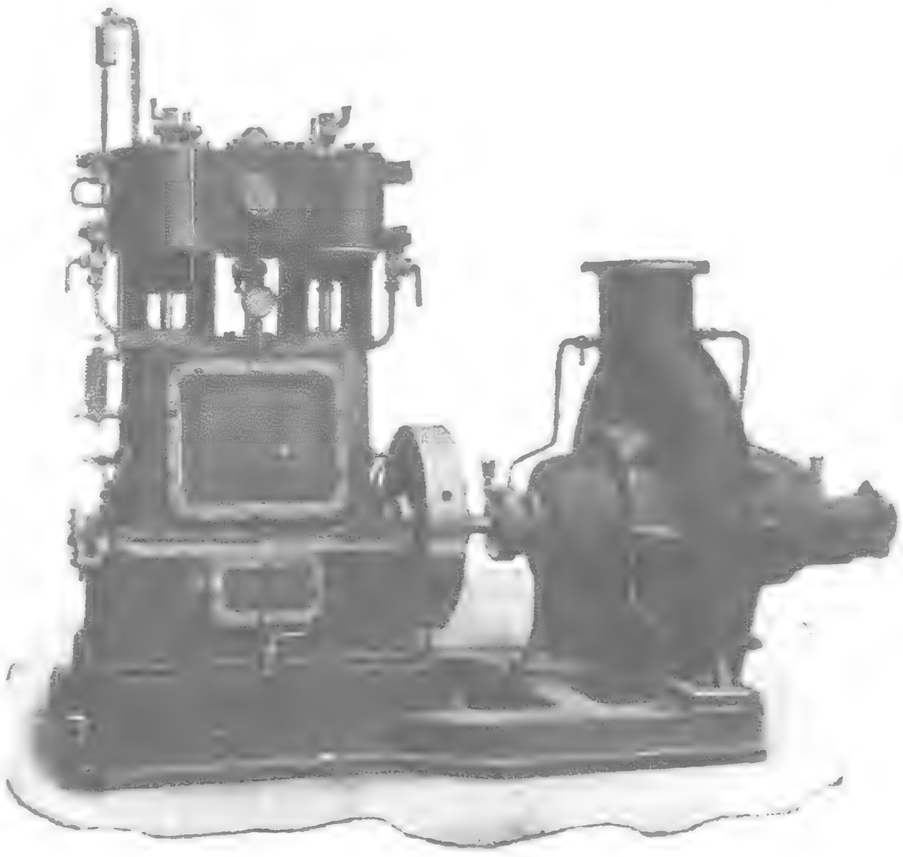
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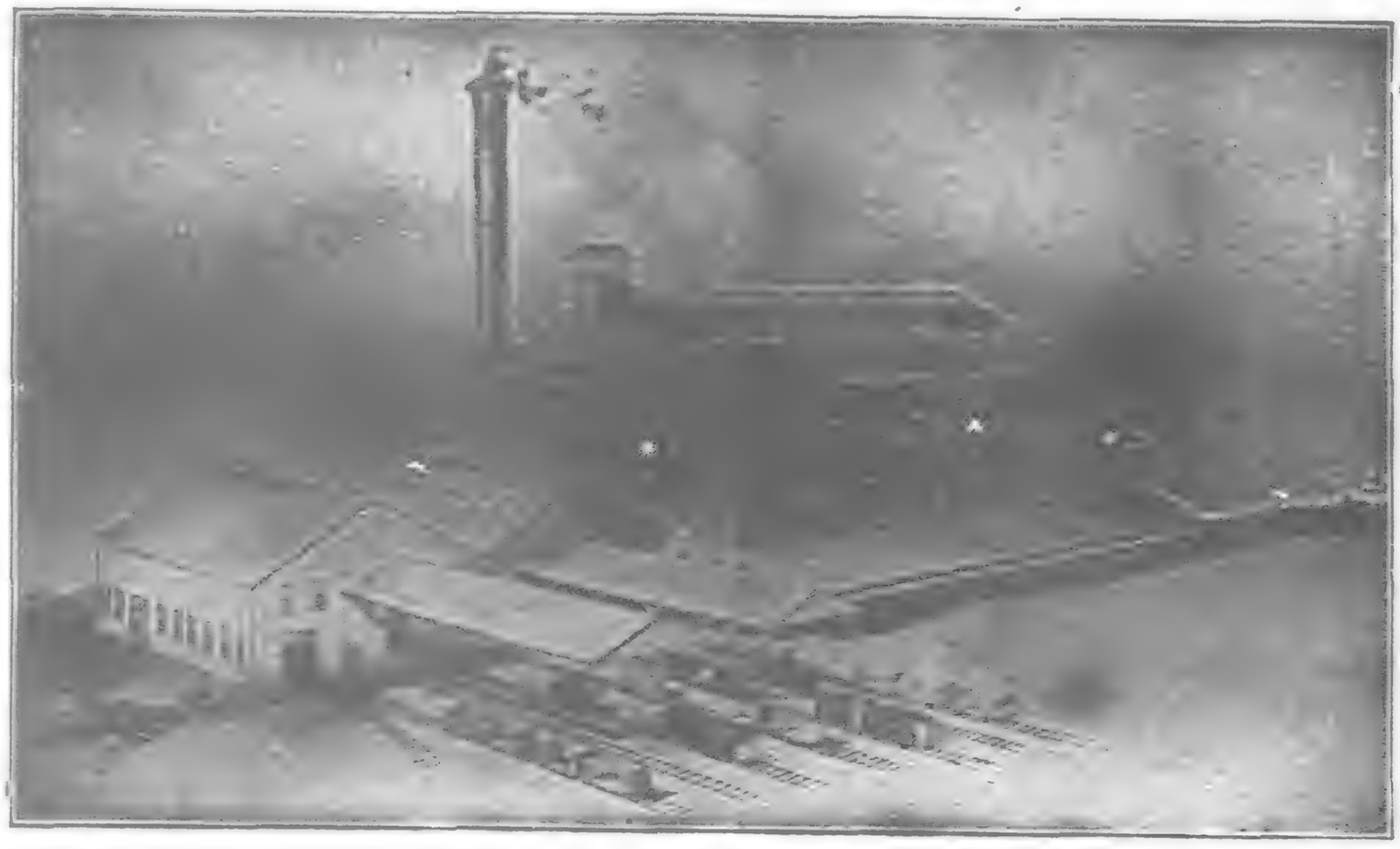
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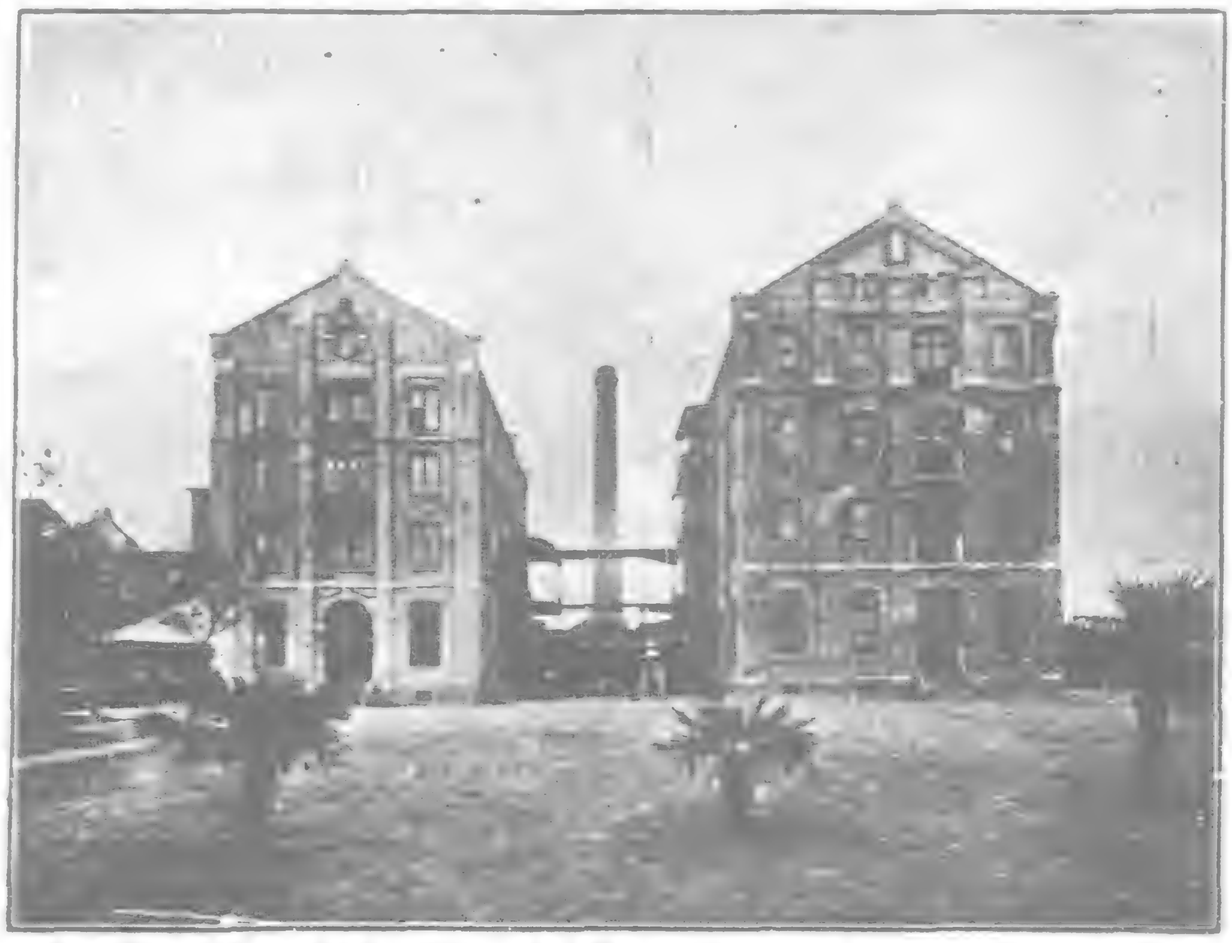
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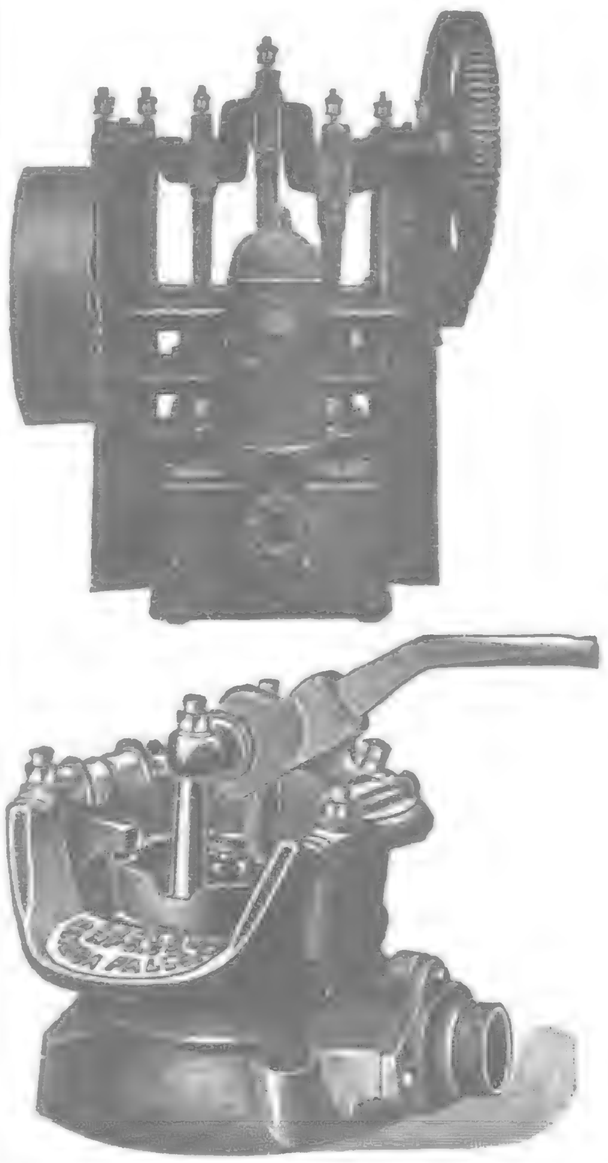
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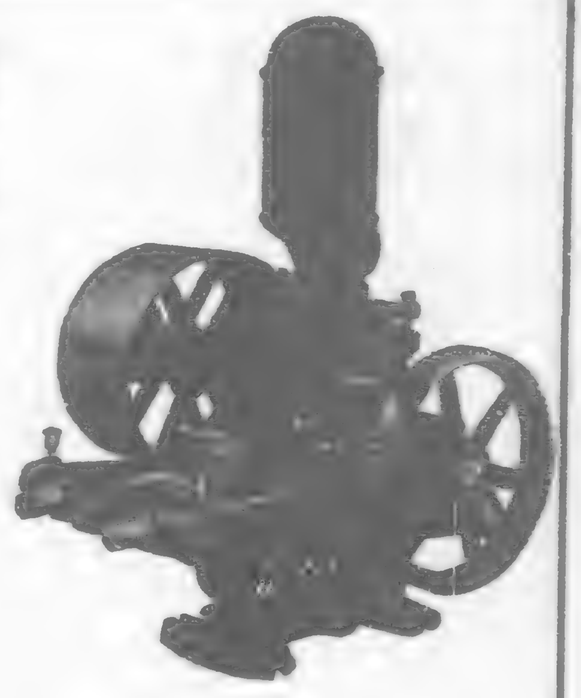
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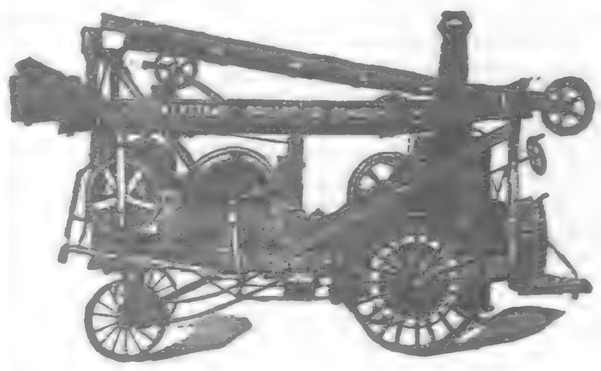
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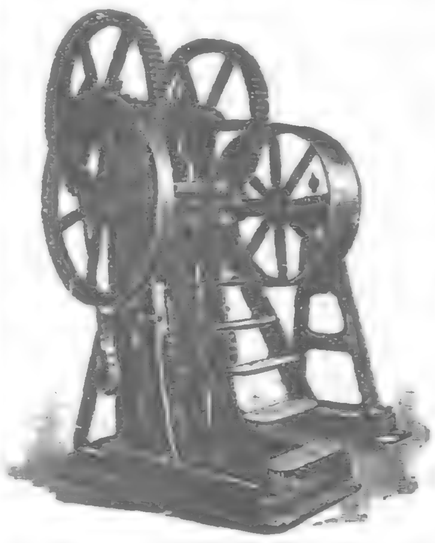
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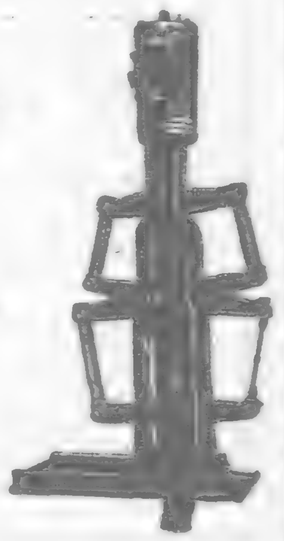


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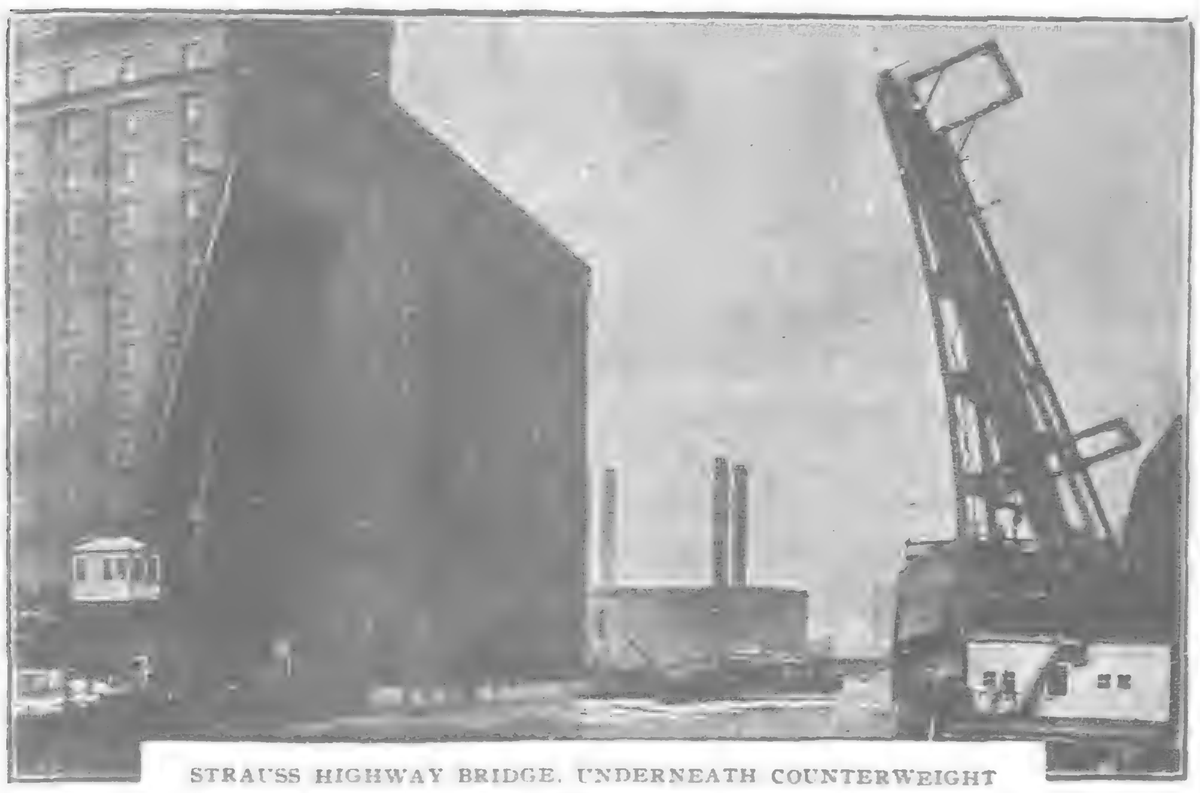
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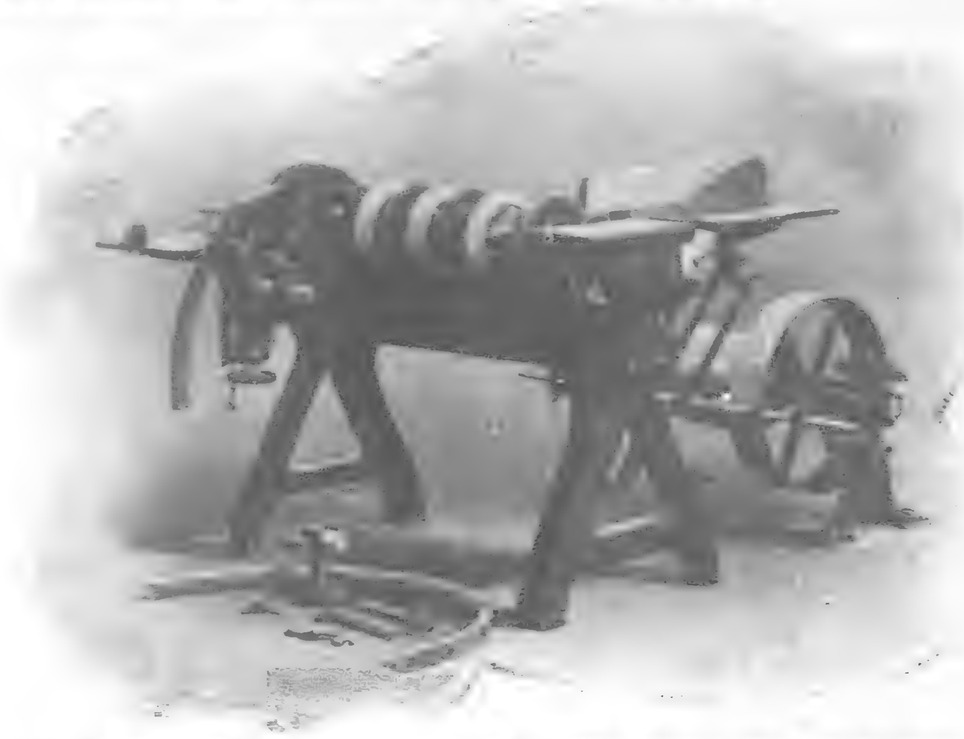
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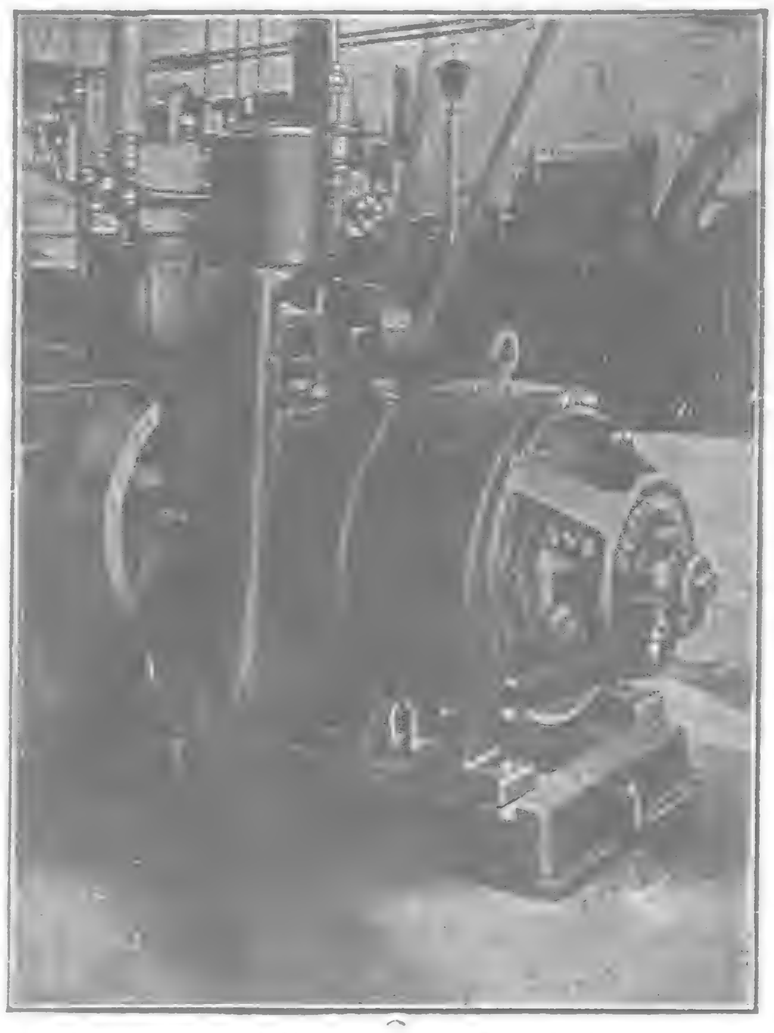
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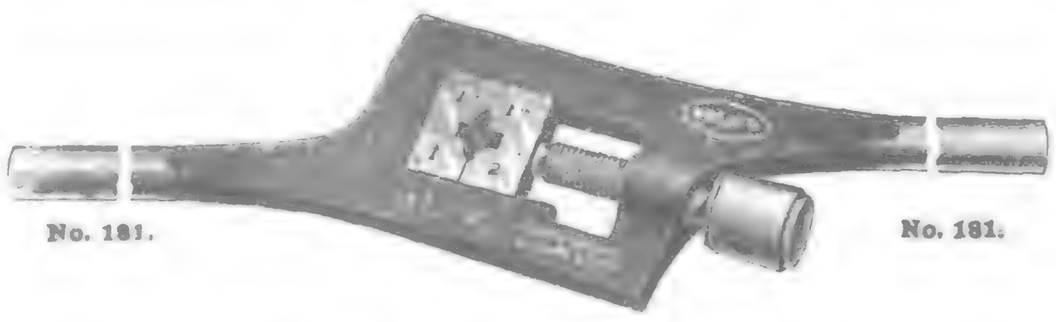
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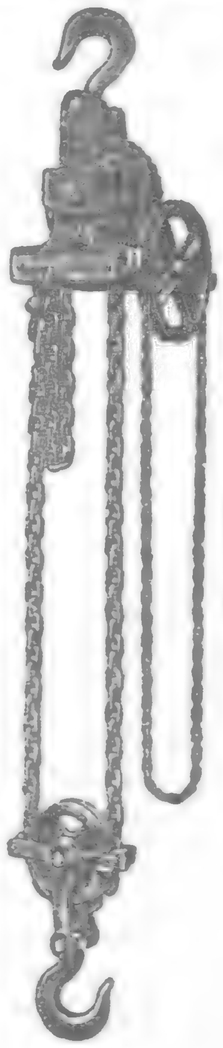
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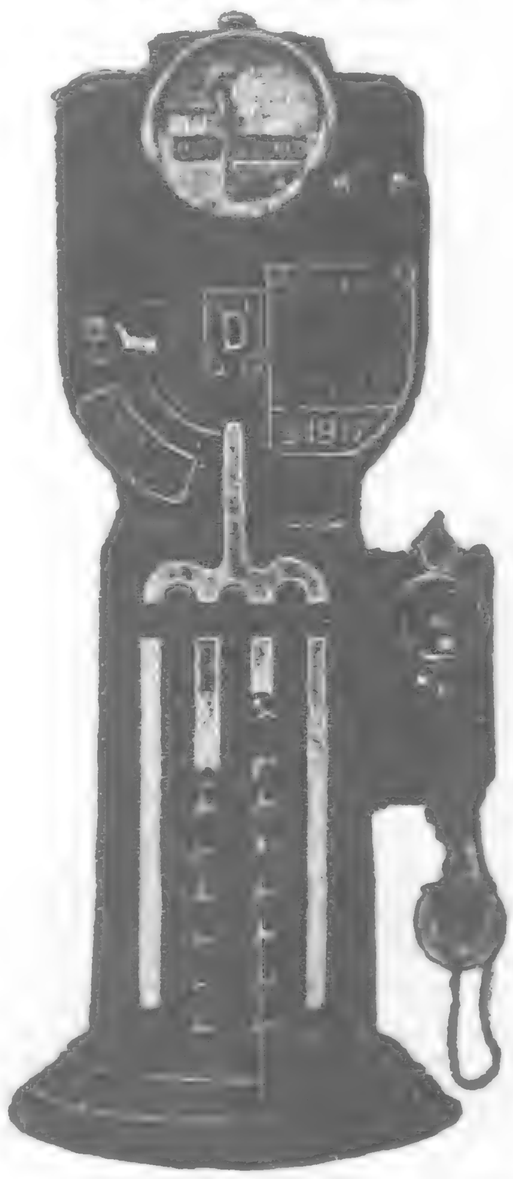
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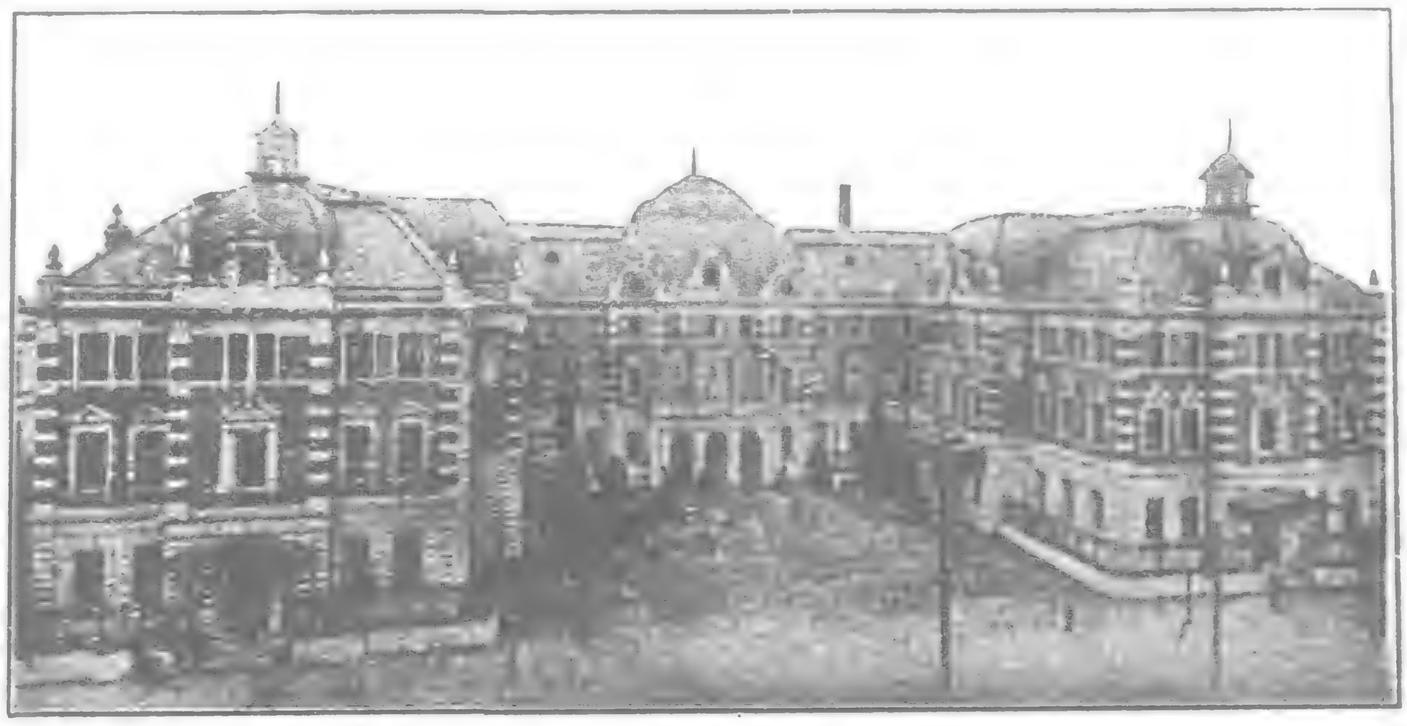


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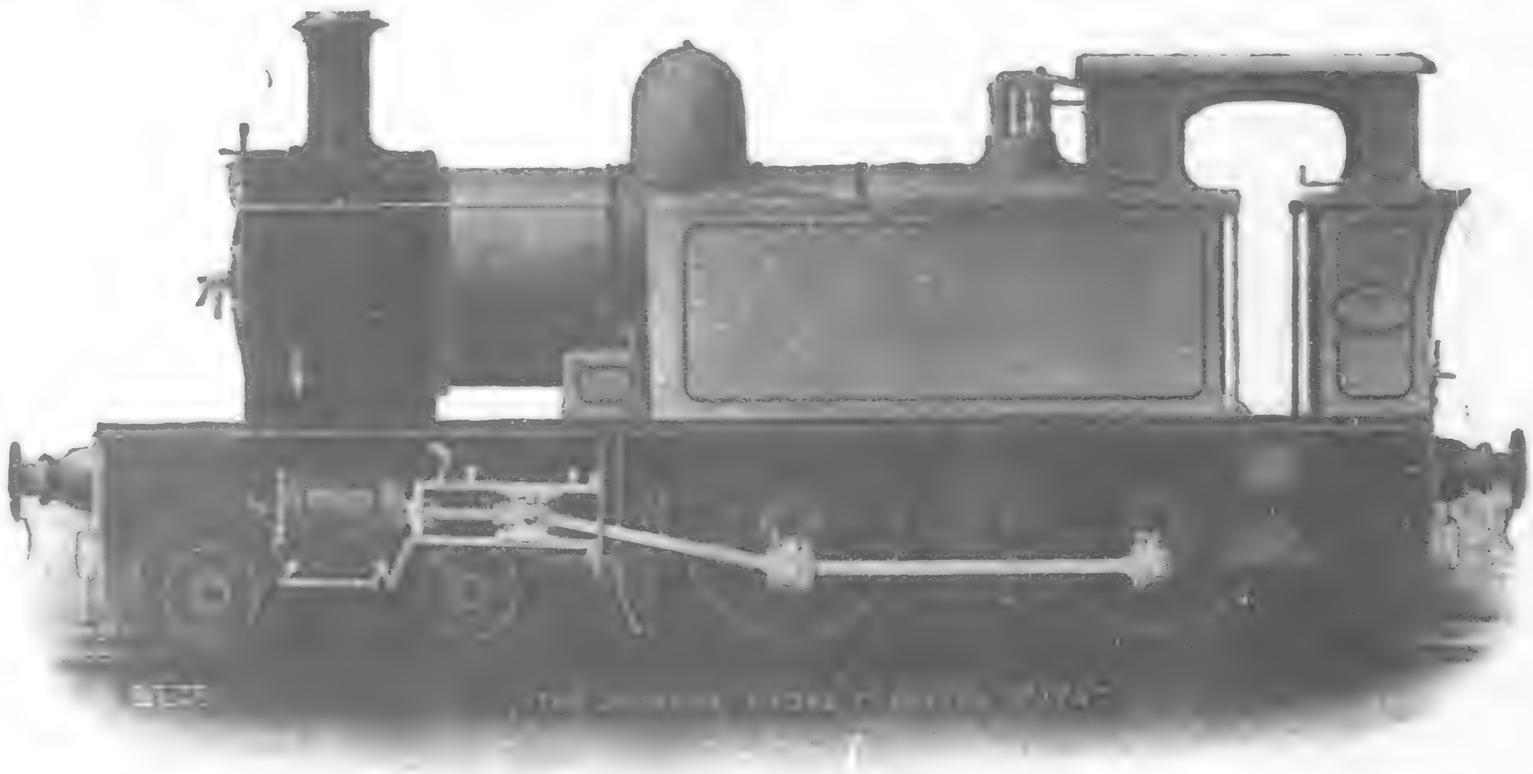


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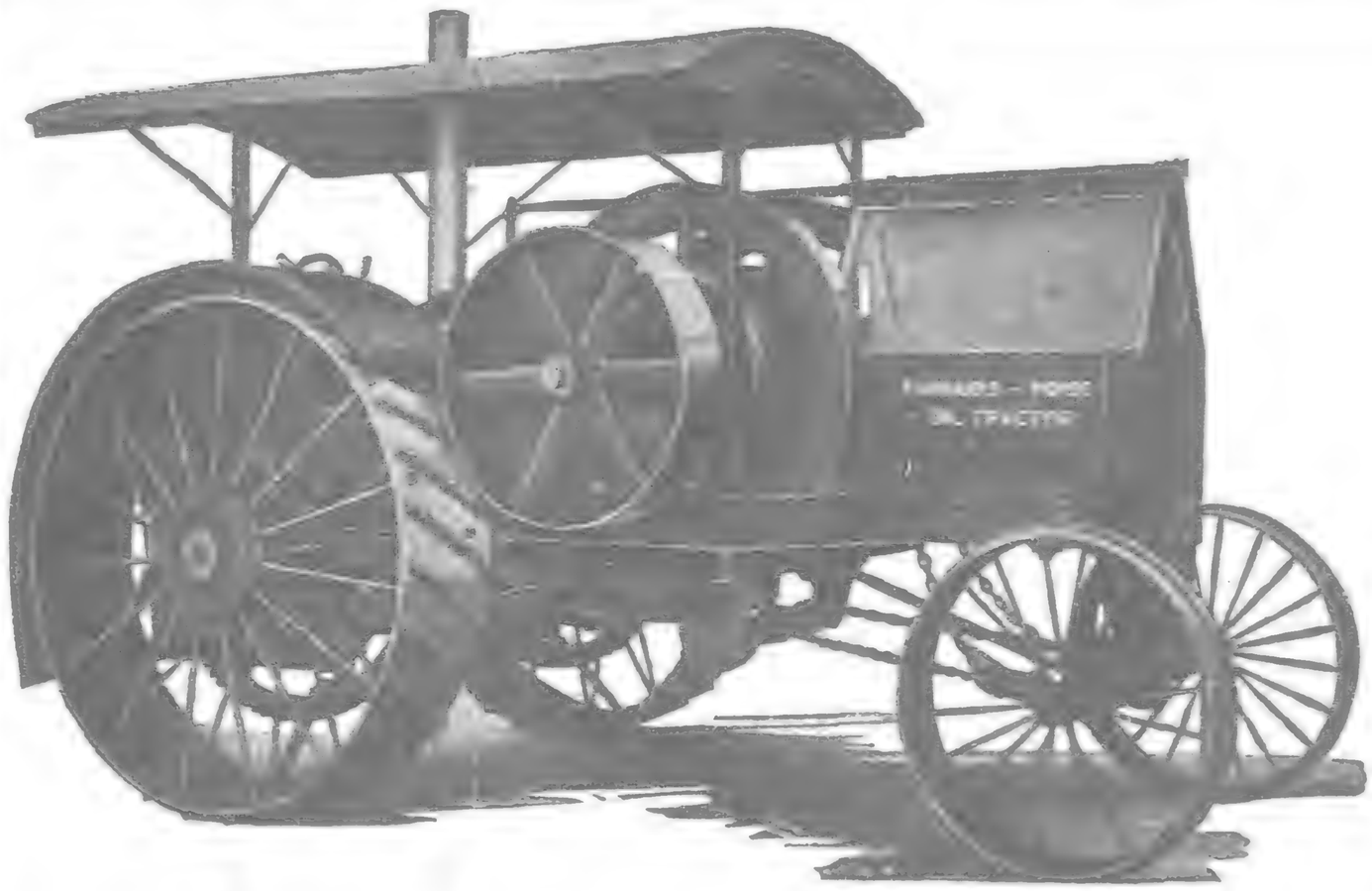
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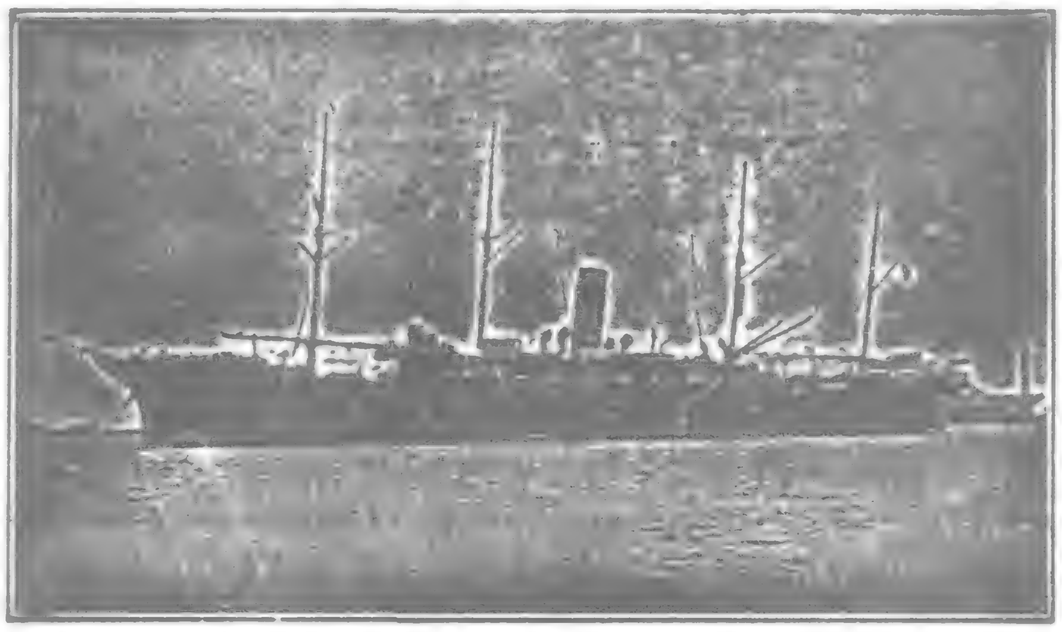
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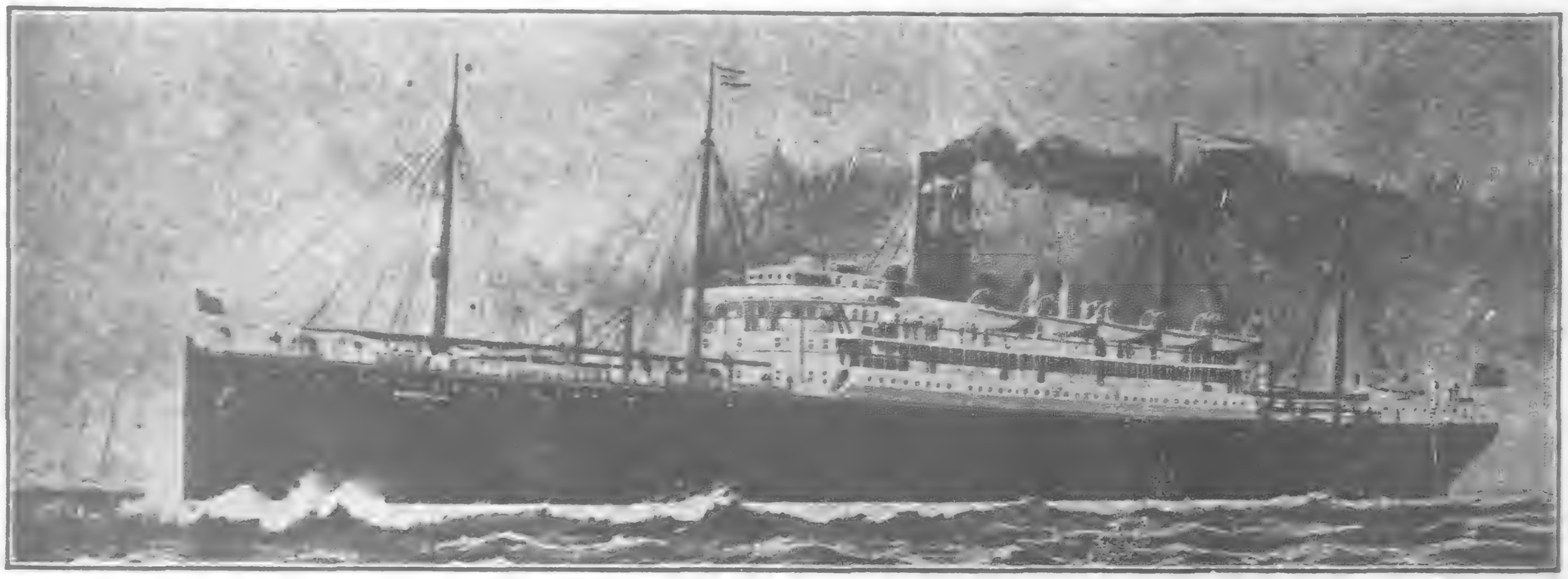
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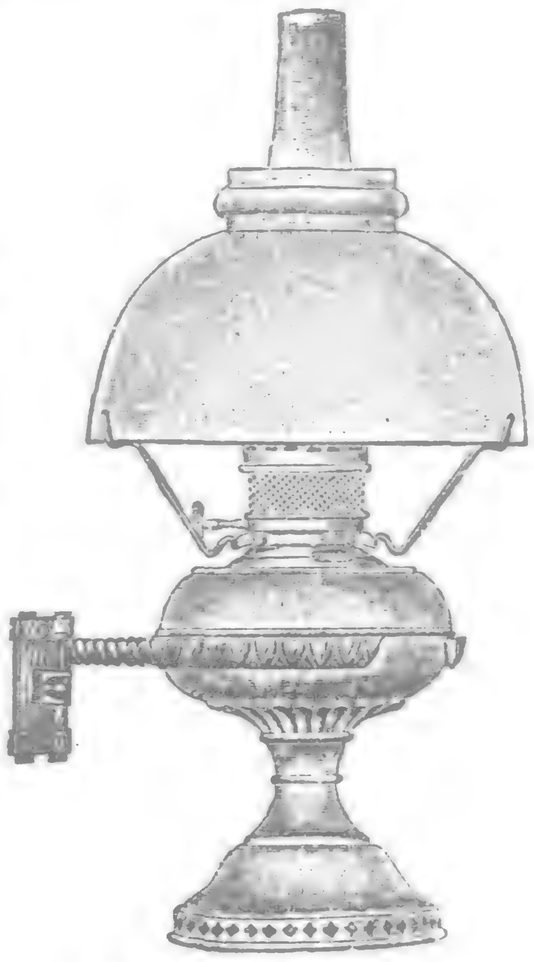
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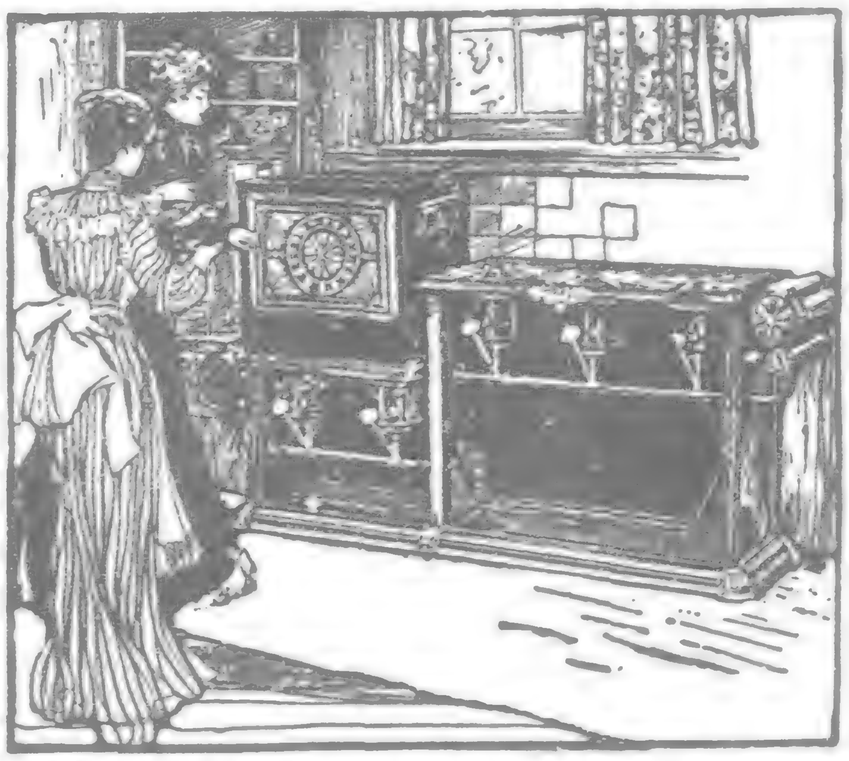
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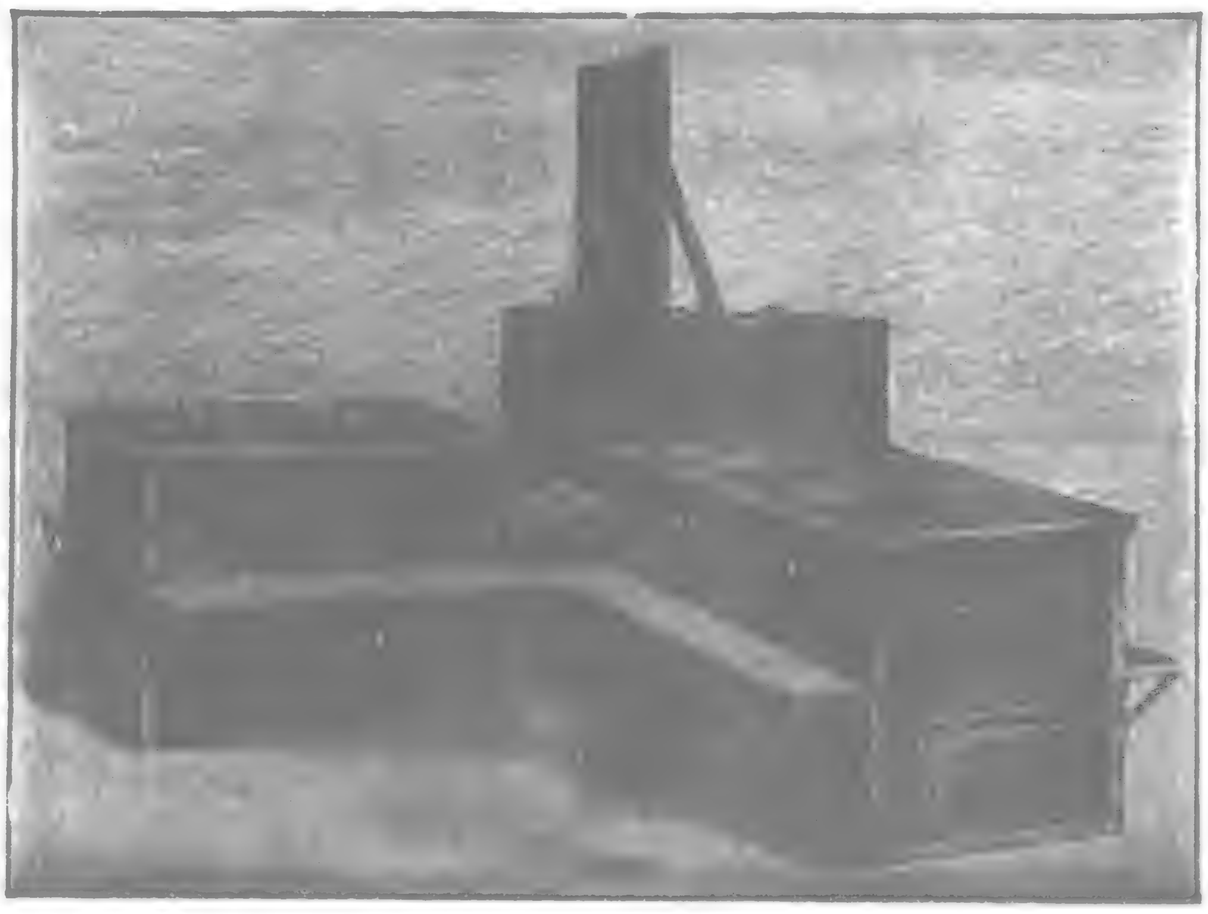
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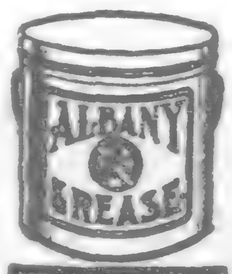
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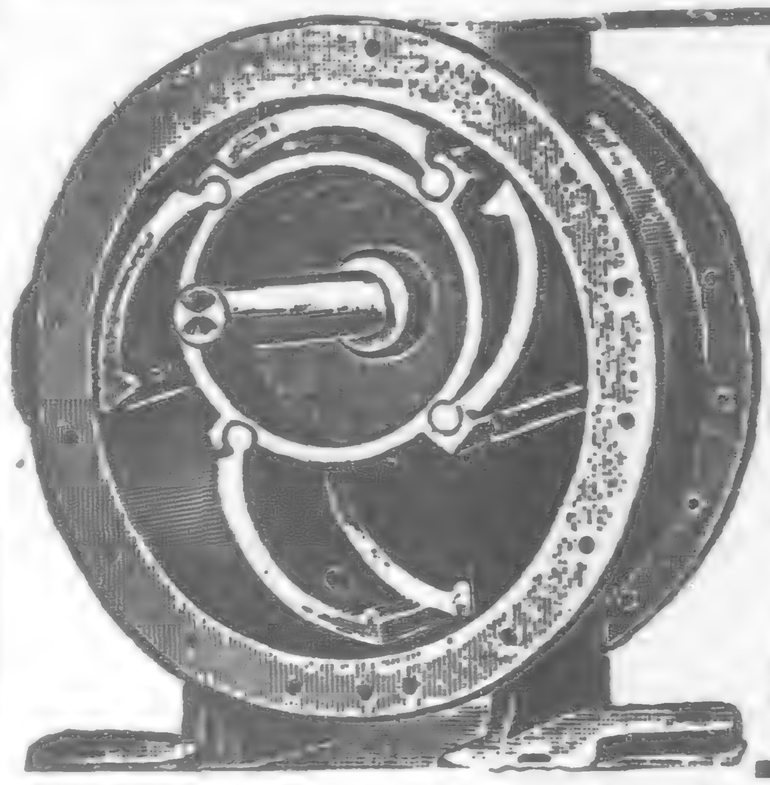


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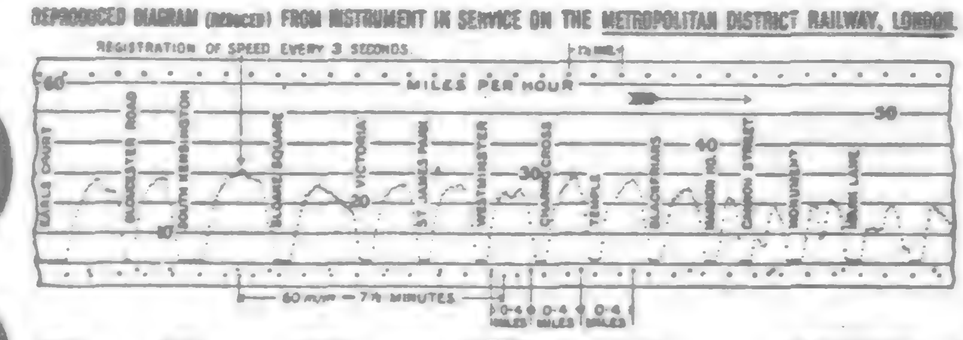
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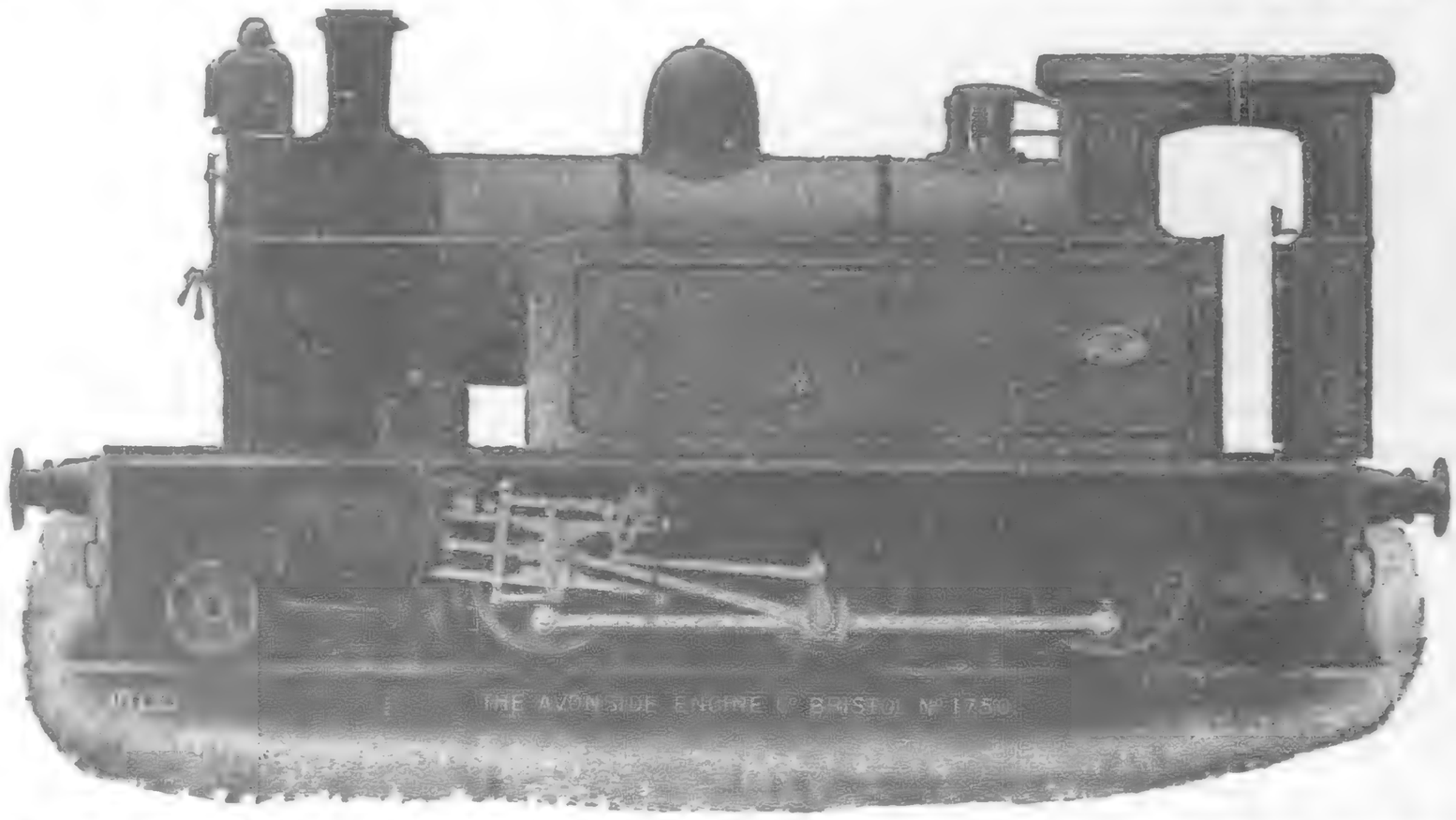
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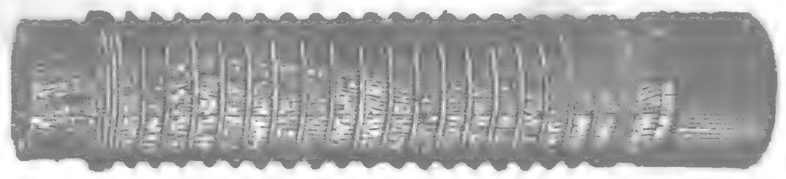
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THE FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

VOL. IX. SHANGHAI AND MANILA, JANUARY, 1913 No. 8

THE TIENTSIN-PUKOW RAILWAY

A Detailed Historical and Descriptive Account

The railway system of China has been materially augmented by a valuable trunk line 621 miles in length connecting Tientsin and Pukow. It effects connection between Shanghai, the emporium on the coast, near the mouth of the Yangtsze River, and Peking, the capital of China. What is more important it establishes effective and rapid communication between the middle maritime provinces of China and those of the north, and opens the way of overland travel from the China littoral to Europe, via the trans-Siberian railway. Shanghai is already placed within 36 hours of Peking, as against the previous nearest route of from three to six days. In the near future, with the introduction of more efficient rolling stock and the betterment of traffic organisation, that time will be materially reduced. Under existing conditions a passenger may leave Shanghai at 11 p.m. on Sunday or Thursday, and dine in Peking on Tuesday or Saturday. If he so desires, he may, at Tientsin or Peking, board the express train leaving for Europe on the latter two nights, having no sea to cross on the journey.

The route is destined to become one of the most popular in China. Certainly for communication between Peking and the seaboard it will eclipse all others. As an earning factor it should early demonstrate its unique advantages. At the same time it should be the means of bringing increasing profit to that already prosperous system known as the Chinese Northern railways, and particularly will it feed the chief portion thereof—the Tientsin-Mukden Section—which route must be used to reach Europe from the north. The southern portion of this now practically completed service was opened between Shanghai and Nanking (a distance of 200 miles) in 1908. At Nanking the Yangtsze River has to be crossed by ferry—which system it may never prove profitable to change by bridging owing to the character of the river bottom and the width and volume of the water, though the future may see a train ferry in operation.

The desirability of filling the gap between the existing southern and northern system by connecting Tientsin with Pukow, a town on the northern bank of the Yangtsze River, opposite Nanking, was the subject of discussion for many years. The idea entered the realms of practical effort in 1908. An agreement was then signed according the right of construction to a German and British syndicate on a loan guaranteed by the Chinese Government, and placing the operation of the road after completion in the hand of the Chinese Government, as represented by the Board of Posts and Communications.

THE LOAN AGREEMENT

The line was divided into two sections. The northern portion from Tientsin extended to the Grand Canal, a distance of 385 miles, and was built by German capital. The southern portion, extended from the Grand Canal to Pukow, some 236½ miles, and was built by British capital. The combination of interests in this line may be briefly explained by reference to the early efforts to persuade the Central Government to undertake the enterprise.

On March 6, 1898, an agreement was signed between China and Germany granting the latter



YI KUNG-CHO

DIRECTOR-GENERAL OF RAILWAYS, CHINA

certain railway construction rights, one clause reading as follows:

> "The Chinese Government sanctions the construction by Germany of two lines of railway in Shantung. The first will run from Kiaochow and Tsinanfu to the boundary of Shantung Province, via Wei-hsien, Tsinchow, Pashan, Tsechuen, and Suiping. The second line will connect Kiaochow with Chinchow, whence an extension will be constructed to Tsinanfu through Laiwuhsien."

This agreement forms the basis of Germany's rights to participation in the Tientsin-Pukow line. The extension in the clause quoted above referred to a line running north and south across Western Shantung. Prior to the signing of this agreement, however, the Chinese Government had granted to a Chinese, Yung Wing, the right to build a line connecting Tientsin with the Yangtsze, by way of Shantung, and on August 23, 1898, a contract was signed for that purpose by a Anglo-American syndicate, for a sum of £5,500,000. A German syndicate in June, 1898, proposed to the Chinese Government to float a loan of £4,500,000 at 5½ per cent., issued at 92 to the Government and reimbursable in 35 years. This offer was refused, but the clash of claims brought about a deadlock which was only solved by an agreement to combine interests. On September 1 and 2, 1898, representatives of the British and Chinese Corporation and the Hongkong and Shanghai Bank conferred with representatives of the German syndicate, and as a result an agreement was evolved as follows:

> "The line from Tientsin and Tsinanfu, or to another point on the northern frontier of the province of Shantung, and the line from the southern point of the province of Shantung to Chinkiang, to be constructed by the Anglo-German Syndicate (meaning the German Syndicate of the one part and the Hongkong and Shanghai Banking Corporation and the British and Chinese Corporation, Limited, on the other part), in the following manner, viz:—
>
> "1.—The capital for both lines to be raised jointly.
>
> "2.—The line from Tientsin to Tsinanfu, or to another point on the northern frontier of the province of Shantung, to be built and equipped and worked by the German group.
>
> "3.—The lines from the southern point of the province of Shantung to Chinkiang to be built and equipped and worked by the English group.
>
> "4.—On completion the line to be worked for joint account."

In addition to a working arrangement with regard to this particular line the parties also defined their spheres of activity in railway enterprise, the Germans restricting themselves to the Yellow River valley and the British to the Yangtsze, a disposal of interests which later gave excuse for much criticism of the British representatives who agreed to the proposals.

Consequent upon this solution of mutual claims the Anglo-German group entered into negotiations with the Chinese Government. On May 10, 1899, a preliminary loan agreement was signed, though progress was ultimately obstructed by the outbreak of the Boxer trouble. Negotiations were not resumed until June, 1902, and the final agreement was not signed until January 13, 1908. That agreement sanctioned the flotation of a loan of £5,000,000 at 5%, issued to the Chinese at 93 and the public at 98¾, for a term of 30 years, repayment to commence at the end of 10 years. The security was a certain portion of the likin and internal revenues of Chihli and Shantung and certain revenues in

Kiangsu. Regarding the administration of the line, Article 17 of the agreement provided that:

> "The construction and control of the railway will be entirely in the hands of the Imperial Chinese Government. For the work of the northern and southern sections respectively the Chinese Government will select and appoint fully qualified German and British Chief Engineers, acceptable to the Syndicate. These two Chief Engineers, shall be under the orders of the Managing-Director, or his duly authorised representative, and will carry out all the wishes of the administration with regards to the plan and construction of the line. They must pay all due respect to the Director-General and the Managing-Director. The terms of their respective agreements will be arranged by the Director-General on his sole authority."

The agreement limited the use to which the loan monies might be put by stating (Article 3) that:

> "The capital will be used for the construction of the line, the purchase of the land and rolling stock, and to meet the current working expenses of the line when in operation, also the payment of the interest on the loan while the line is being constructed."

To avoid peculation, Article 14 provided that:

> "during the period of construction the accounts will be open at any time to an inspector appointed and paid by the Syndicate."

To ensure Chinese control after completion Article 17 stated:

> "On the completion of the line the Imperial ChineseGovernment will administer both sections as one undivided Government railway and will appoint an Engineer-in-chief, who, during the period of the loan shall be a European, without reference to the Syndicate."

These terms were distinctly favorable to China, and the precedent set has been seized upon and will be used to obtain better terms in future agreements The Board of Posts and Communications are convinced that the management of roads should be in the hands of the Government. And in the hands of Government they should be exceedingly profitable, though everything depends not only upon sagacious management, but upon scrupulous treatment of earnings. The European bankers' sole and only object in endeavoring in the past to obtain supervision over railway management and finance were to see to it that all monies were honestly dealt with and the interests of bondholders protected. The opponents of what are now described as "the Tientsin-Pukow terms" declare that the way has been deliberately left open for ruthless squandering and peculation of railway funds. It is therefore, all the more incumbent upon the railway administration to demonstrate to the world that they are capable of controlling their officials and the funds that are destined to pass through their hands. If the Board of Posts and Communications can do this they will justify what caustic critics, in their mildest moments, characterise as "the British Legation's optimistic faith in Young China." They will at the same time, give the lie to the statement that "there was nothing, either in the necessities of the situation or in recent experience, to justify recognition of the provinces' claims to handle foreign capital without restriction or supervision." Likewise they will refute the statement that "British diplomacy in agreeing to these new terms, consented to arrangements which were morally certain to weaken the Central Government's credit abroad and its authority at home." The officials of China are distinctly on their trial.

Originally the loan above mentioned was to have been for £7,500,000, but ultimate discussion reduced it to £5,000,000 to be issued in two instalments. The first was, as has been mentioned, placed on the market in March 1908, at 98¾, the price to the Chinese Government being 93% of the face value (£100). On future instalments the Chinese Government was to receive the same rate as paid by the public less 5½ points commission to the financial syndicates.

The second instalment was floated in June, 1909, and was for £2,000,000 at 5 per cent., issued at par. Both issues were over-subscribed. This oversubscription at once gave evidence of the popularity of these investments. One feature was the considerable portion subscribed for by Chinese in Peking and Tientsin, three of the Metropolitan Boards securing £260,000 in bonds, exclusive of those purchased by private Chinese investors.

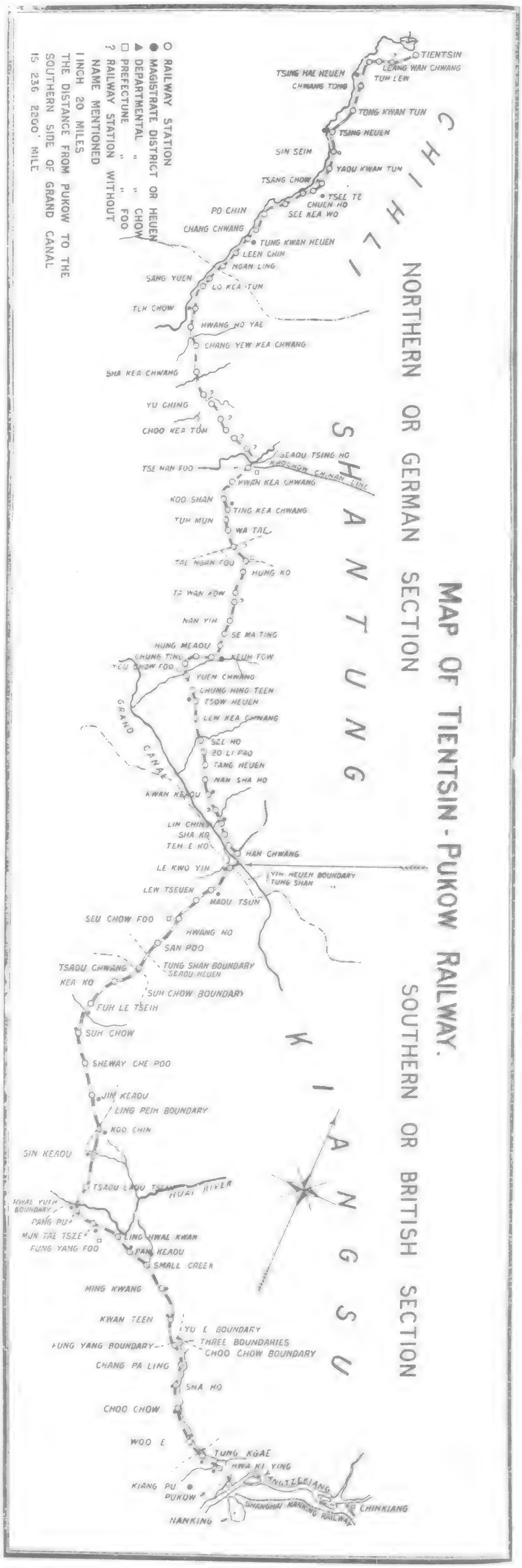
By 1910 the amounts so raised were exhausted, and it became necessary to raise a supplementary loan to complete the work. A new agreement was entered into for a loan of £4,800,000 at 5 per cent., and the instalment of £3,000,000 was offered to the public, £1,110,000 in London and £1,890,000 in Germany. This loan was submitted to the public at 100½ per cent. Despite its issue at a premium it was so heavily oversubscribed on the day of issue that the subscription lists were closed in London 50 minutes after opening. The quotation was then at ¾ premium, though it eased a little afterwards, and closed at ½ premium. The balance of the bonds (£1,800,000) is still outstanding, though private advances of £500,000 for the German section and £400,000 for the British, have been made.

It is of interest to recall that in the final negotiations Liang Tun-yen represented the Chinese Government, and Mr. J. O. P. Bland the Chinese Central Railways Company, Ltd., (the substitute of the British and China Corporation which conducted the opening negotiations) and M. Cordes, the Deutsch-Asiatische Bank. The Chinese Central Railways Company, Ltd., was formed in January, 1904, with a capital of £101,000.

Inauguration of Operations.

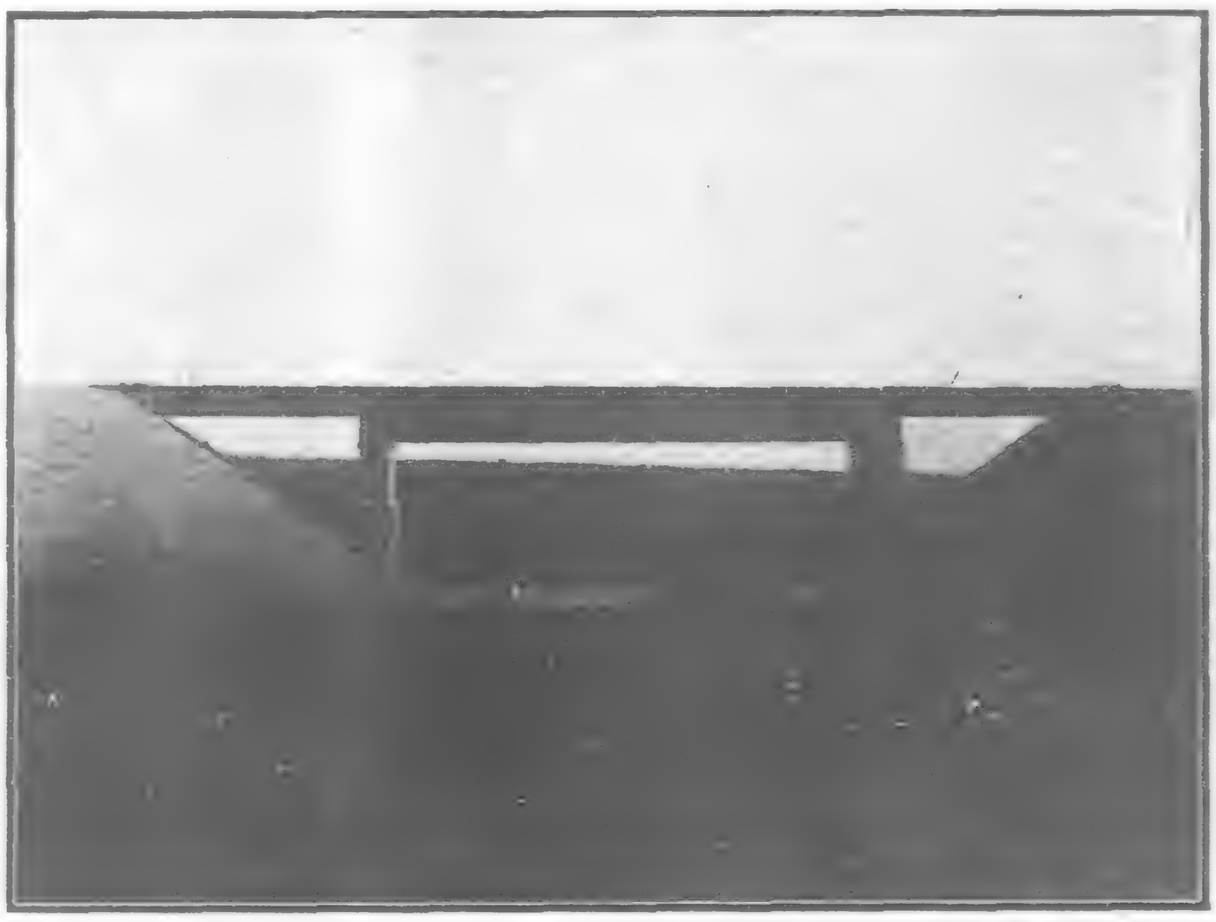
The successful flotation of the first loan did not mean a simultaneous commencement of construction work on both sections. The official inauguration of operations in the north took place on June 30, 1908, when the Chihli Viceroy with much ceremony, turned the first sod at Hsi-ku, a suburb of Tientsin. Work commenced in August. On the southern section the turning of the sod did not take place until October of the same year, and work was not begun until January, 1909, by which time the northern operations were in full swing. Lu Hai-huan was appointed the Director-General of the whole line, and under him were Li Te-Shun as Managing-Director of the Northern Section, and K. S. Low in a similar capacity in the south.

The early operations in the north were unhappily marred by a scandal which involved primarily the Managing-Director, Li Te-shun, and secondarily the Director-General and others. The Director-General is supposed to have suffered





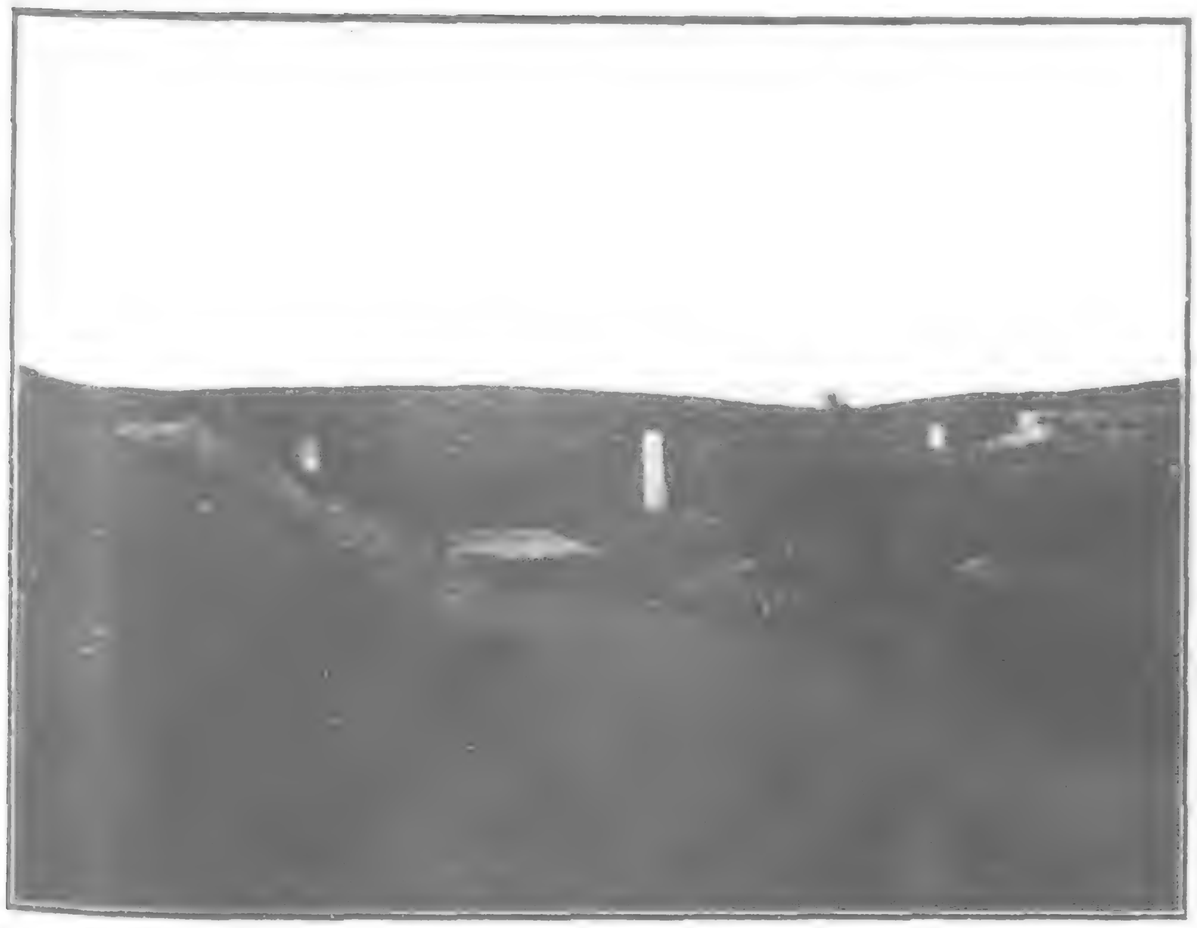
TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. ROCK CUTTING AT SANCHIEH



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. BRIDGE WITH STONE PIERS



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. HSUCHOWFU STATION



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. ONE OF THE BRIDGES



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. CUTTING AND CURVE

solely because he was in the post of responsibility and not because of any complicity in the alleged frauds. He was charged with malpractices and corruption, the latter comprising bribes in connection with land purchases at the site of the proposed Tientsin station, coal contracts, employment of coolies, etc., to the extent of Tls 3,500,000. Public feeling was excited by the exposure of Li by leading men who had suffered as a result of land speculation. Li appears to have undertaken that the Tientsin terminus of the railway should be at a certain point, and, in accordance with a promise to that effect, certain merchants launched into large land deals in the locality Li was involved either in speculation or peculation, or both, and Nemesis came upon him when the Viceroy of Chihli decided to place the terminus somewhere else other than in the place arranged by Li. The result was the loosing of a veritable Bedlam. Impeachments were lodged in Peking, and, as a result, an Imperial Edict was issued cashiering the Director-General, Lu Hai-huan, and the Managing-Director Li, the edict forbidding the latter to re-enter the Imperial service. Several others connected with the scandal were likewise deprived of rank, one being exiled and another being deported to his native town to be placed under surveillance.

Hsu Shih-chang, then President of the Railway Board, was authorised by the Regent to take up the duties of Director-General and he signalised his entrance to office by personally being responsible for all disbursements, an order from him prohibiting either of the Managing-Directors from paying out funds exceeding $500 without special sanction.

The trouble connected with the location of the station was settled by establishing it at the existing stopping place on the line to Peking, formerly called the "Tientsin City Station." A new station was also established on the right bank of the river and called "Tientsin West." The former "city" station was called "Tientsin Central," while the old station of the Peking-Mukden line in the Russian concession, formerly named "Tientsin Settlement" station, was renamed "Tientsin East." It is now the terminal of all trains from Pukow.

Another matter which at one time called for strong comment in British papers was a charge of irregularity with regard to the letting of tenders, and a series of questions was asked by Lord Winterton in the House of Commons to elicit information as to whether tenders were being called in the best interests of manufactures. Article 18 of the agreement which deals with the matter is reprinted here as a record, since the FAR EASTERN REVIEW has made particular efforts to obtain a fair field for suppliers in the awarding of tenders in China. The article says:

"For the Northern and Southern Sections of the Railway, respectively the Deutsch-Asiatische Bank and the Chinese Central Railways Limited will act as agents of the Railway Administration during construction for the purchase of all materials, plant and goods required to be imported from abroad. For all important purchases of such materials tenders shall be called for by the Managing-Director; in the case of all tenders, indents and orders for the importation of goods, and materials from abroad the said agents shall purchase the materials required on the railway and shall charge the original net cost of the same plus a commission of five (5) per cent. It is understood that no orders for materials shall be executed or any expenditure incurred without due authorisation by the Managing-Director.

"In return for payment of commission as above stated, the Deutsch-Asiatische Bank and the Chinese Central Railways Limited as agents, within their respective sections, shall be prepared to superintend the purchase of all foreign materials required for the construction and equipment of the railway, which shall be purchased in the open market at the lowest rate obtainable, it being understood that all such materials shall be of good and satisfactory quality, and that the railway administration shall have the right to reject on arrival in China materials which do not come up to specifications. At equal rates and qualities goods of German and British manufacture shall be given preference over other goods of foreign origin for the Northern and Southern sections respectively. The railway administration reserves the right, while paying the above stipulated commission to the said agents in respect of the purchases of foreign materials, to avail itself of the services of other agents in China or abroad should it see fit to do so.

"Original invoices and inspectors' certificates are to be submitted to the Managing-Director; and all purchases made by the agents on behalf of the Railway shall be supported by manufacturers' original invoices and inspectors' certificates.

"No commission shall be paid to the agents except as above provided; but it is understood that the railway administration shall provide out of railway funds for the remuneration of consulting engineers whenever their services are engaged.

"With a view to encouragement of Chinese industries, preference will be given at equal



CHOU TZE-CHI

TUTU OF SHANTUNG WHO DROVE THE LAST SPIKE OF THE YELLOW RIVER BRIDGE



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. MR. T. W. T. TUCKEY, M. INST. C. E., ENGINEER-IN-CHIEF, AND OFFICE STAFF



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
A PLATE-LAYER'S HOUSE

prices and qualities, over British, German or other foreign goods to Chinese materials and goods manufactured in China. No commission will be paid on purchase of such materials and goods.

"It is understood and agreed that after the construction of the line is completed the Deutsch-Asiatische Bank and the Chinese Central Railway Limited, within their respective sections, will be given the preference for such business, during the currency of the Loan, for the supply of foreign materials as the railway administration may require, on terms to be hereafter mutually agreed upon."

Route of the Line

The route of the line runs to a greater or less extent parallel with the Peking-Hankow Railway which connects the capital with the Yangtsze some 200 miles to the west. For its entire length the line also practically parallels that famous monument to Chinese ancient enterprise, the Grand Canal, and in Shantung the traveller may at many spots see the tops of junk sails on the waterway above the distant trees. The crossing of the canal is practically the junction of the northern and southern sections. Between Tientsin and the Yellow River the country is a vast level plain of alluvium mingled with loess, and without grades. It is intensely cultivated, but the soil grows less productive as the Yellow River region is reached.

After crossing the river (over the splendid bridge illustrated and described in detail in the October number of the Far Eastern Review) and passing Tsinan-fu the capital of Shantung, hilly country is reached, the formation being a mingling of gneiss, granite, sandstone, and limestone, and a few hours out the historic Sacred Mountain, Tai-shan, is passed, the line skirting its base. The rugged peak rises 5,060 feet directly from the plain, and is the most noted of the five sacred mountains of China. It was a famous pilgrim resort twenty centuries before the Christian era. As tradition records, the ancient monarch Shun (one of the first Emperors of China, who reigned B.C. 2255 to 2205) is said to have sacrificed there. At the present day each sect has erected temples and monasteries on its peaks, and thousands of pilgrims throng to them in spring time. Likewise Europeans have taken advantage of its salubrious heights and in the summer months escape the heat by residing in the various houses built in the groves.

Skirting hills and crossing wide cultivated plains the sub-prefecture or district city of Kufeu-hsien is passed. This is the birth place of Confucius. The great sage was born there 551 B.C. and died in 479, his tomb, also the resort of great numbers of pilgrims, being reached by leaving the train at Chufu, a few miles to the north of Yenchow-fu.

Great plains are traversed almost to the Yangtsze, but as the southern section of the line passes out of Shantung the soil becomes poorer, though grain in large quantities is grown, and further south towards Pukow sesame seed is produced in large quantities, and the region is likely to prove a rich bean producing one when that crop is properly introduced.

Towards the south of Shantung the line for some distance skirts the Weishan lake, a large sheet of shallow water, connected with the Grand Canal, which is soon afterwards crossed. Rocky country is here entered, the elevation being some 300 feet above the level of Nanking, and the line dips to the great plain which practically continues for the next 135 miles to Pukow, passing through the flood and famine region of the Hwai River valley and the Shai Ho valley. Shortly after crossing the Grand Canal, Hsuchowfu is reached, and this point is of interest as it is in the old bed of the Yellow River. The old embankments still stand.

The southern section furnished grave problems for the engineer in embankment work and the prevention of damage from flood, which were solved with credit, the provisions against floods or the breaking of river dykes, notably the Hwai River banks, being excellent.

Taking it all through, the country developed by the line is rich agriculturally, grain being raised on the lowlands and fruit on the highlands. Coal and iron deposits exist in certain localities and there are indications of the presence of lead and other metals. Building stone for building and other commercial purposes is also plentiful, and especially in portions of Shantung not far from Tsinan-fu there is a large industry in the production of mill-stones for the crushing of grain. These have been exported for hundreds of years to different parts of the country, by various means, some finding their way to the southern provinces by the Grand Canal. Brick-making also shows promise of development.

The fact that the line runs between the two large rivers, the Yangtsze and the Yellow, gives it great prospects and the possibilities to the westward are sufficient to give it considerable importance. Its prospects as an earner are exhibited by the figures for November last, which showed a return of $524,678, which may be taken as a fair average. The total for the year would be $6,296,136, which is remarkable when it is remembered that only two through trains run each way at present each week, while the ordinary daily service is hardly more than of a construction train nature, no effort being made yet to attract passengers or freight.



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
TUNG KE SWAMP, THE WORST TROUBLE ON THE LINE

Methods of Construction

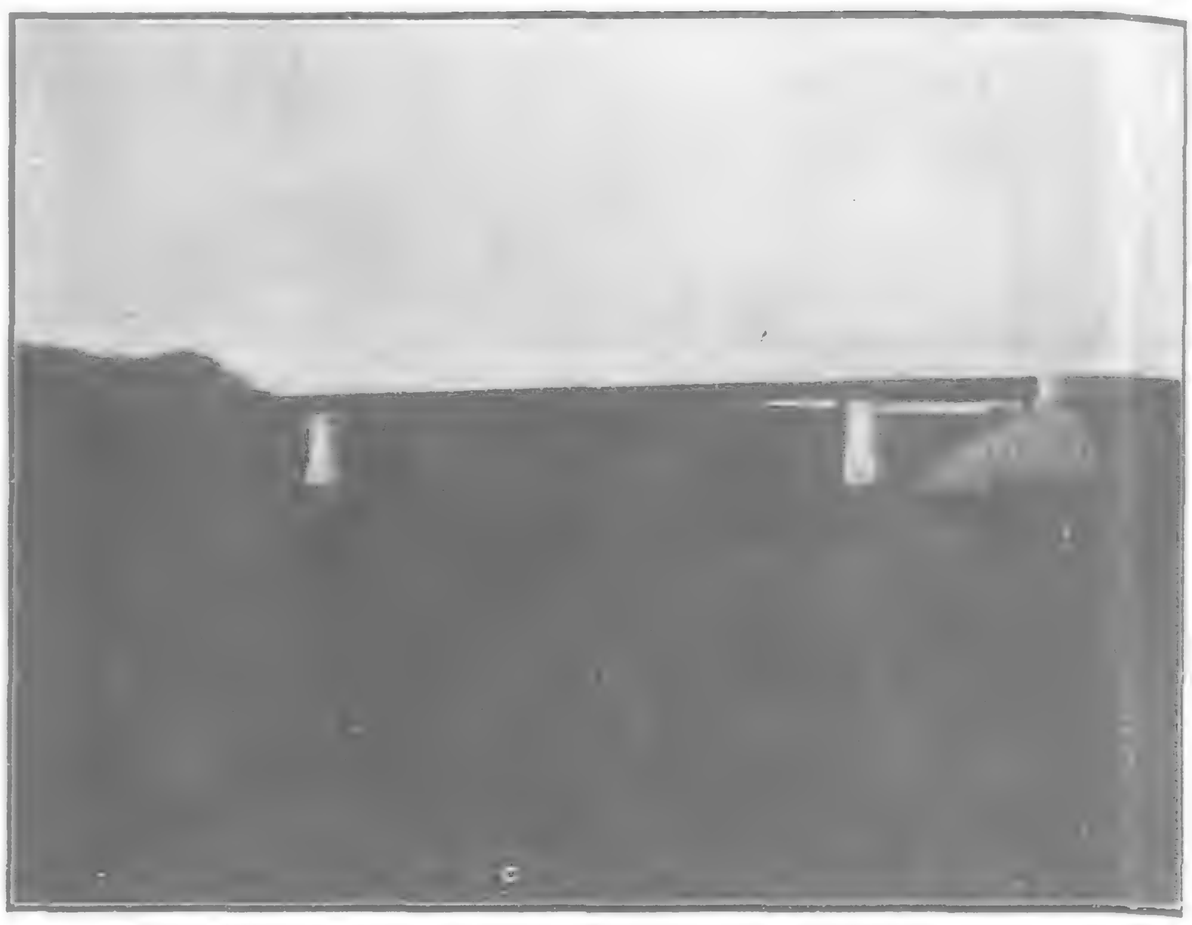
As is the case with all railways in China coolie labor was used throughout the construction, with very few mechanical aids. The low prices obtainable make it very difficult for machinery to compete, especially in view of the high cost of coal. The contract system, dealing with native contractors, has also been found to give satisfaction in the manner of performance of the work. The bulk of the labor is employed locally from the farming class, but, on this



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
VIEW AT MILE 51



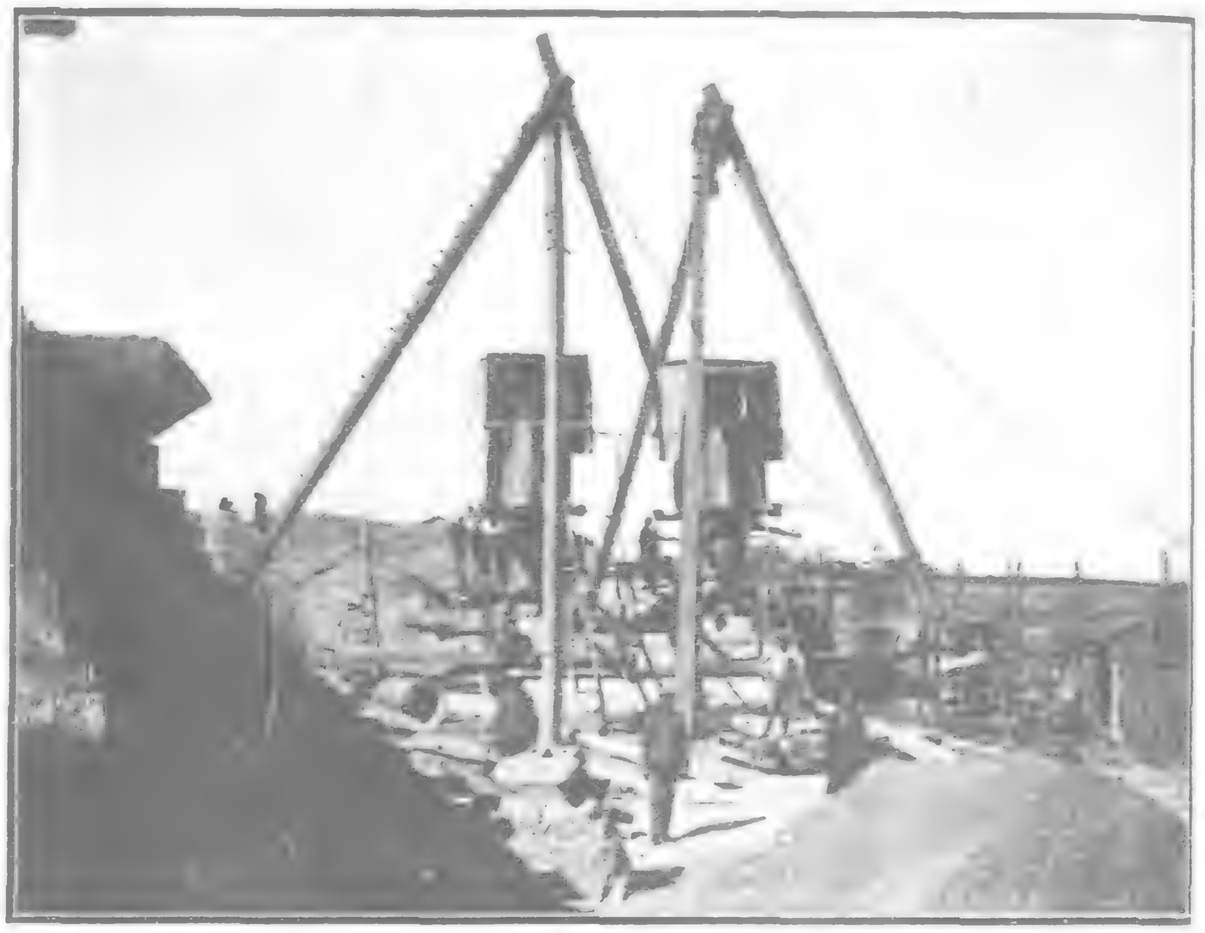
TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
TRAIN AT PENG-PU



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
BRIDGE WITH CONCRETE PIERS



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
VIEW NEAR PUKOW



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
SINKING A BRIDGE PIER BY COMPRESSED AIR



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
TERMINUS ON THE YANGTSZE



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
A THIRD CLASS STATION

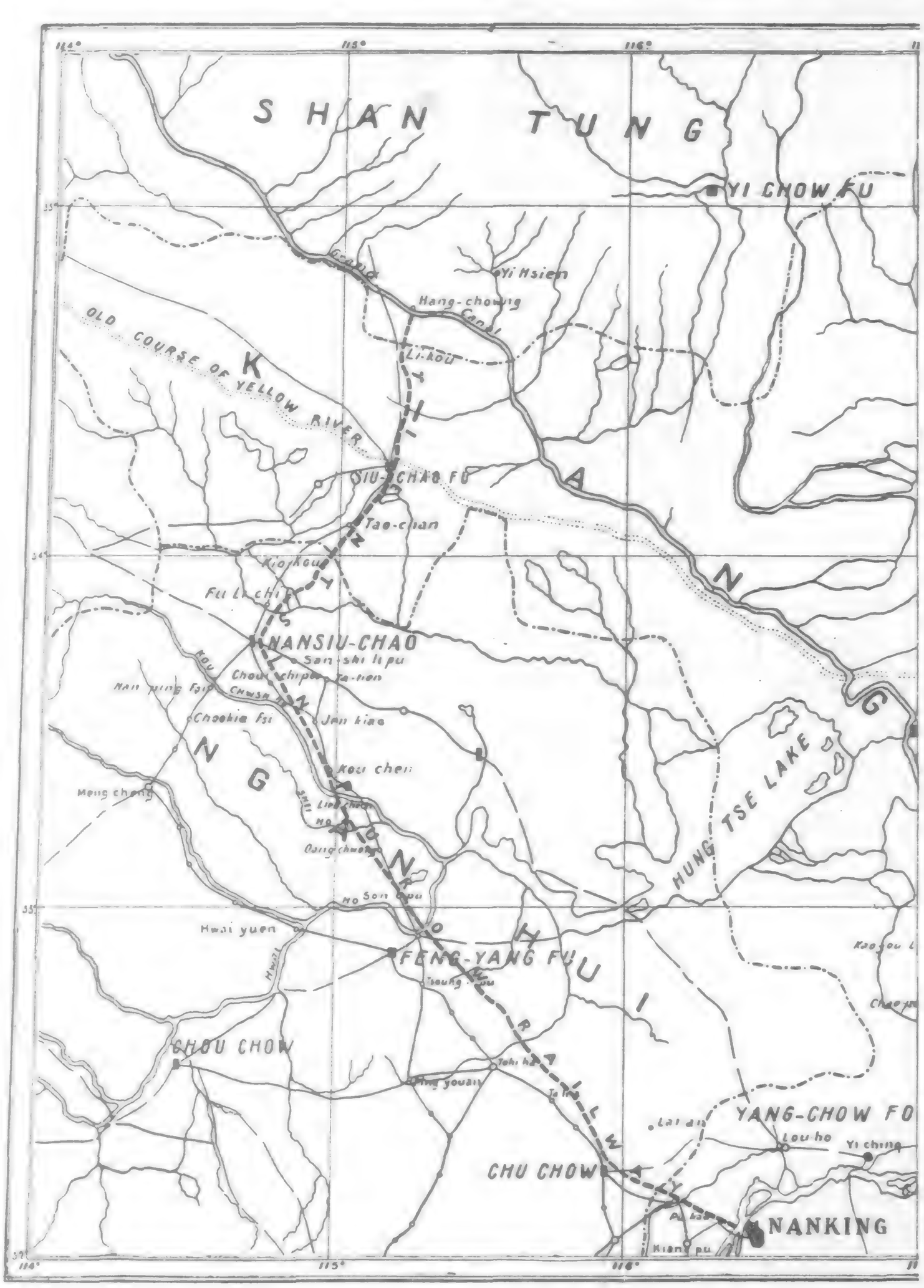
line a number of experienced workmen who had assisted in building the earlier roads in the north, were available as construction foremen.

Grading and concrete work were conducted with the ordinary coolie methods of manual handling and mixing, and transporting in baskets. Carpenter work on forms was done by Chinese carpenters, the timber being mostly imported from Oregon and delivered at the working site in large sticks, such as 12 X 12 inch pieces, and then sawed up into boards by hand. This was for convenience in shipping and added security against theft of lumber. Scaffolding, bracing, and false-work were in many cases made of cross-ties piled crib-fashion. Quarrying of rock for concrete was done by hand in quarries opened along the right-of-way in sections where stone was plentiful. All of the drilling was by hand and the rock was broken up by hammers after blasting. Where stone was scarce it was purchased from Chinese quarrying contractors and delivered by water at some point near the line.

One incident illustrative of what can be done by the Chinese when left to their own devices is worthy of mention. During a phenomenal flood at the River the bridge in course of construction carried away and one section of the steel work, weighing something like 300 tons, was displaced and sank in the stream. The Chinese undertook to raise the sunken section and after a time accomplished the task, ultimately landing it intact on the river bank, whence it was subsequently placed in position. The foreign engineers, knowing the capacity of the Chinese in heavy weight lifting, interfered in no way with the effort, and contented themselves by merely supervising the operation.

On the Northern section thousands of coolies were employed at the numerous brick kilns erected at the different points to employ ballast for the line, and they displayed exceptional ability in using modern methods in this direction. On the Yellow River bridge, too, as on all other bridges, they were the sole laborers employed on the erection of steel work, exhibiting great adaptability in this direction and performing the work of skilled artisans to the thorough satisfaction of the engineers. In many respects the coolie labor falls far short of that available in European countries, the coolie being much slower at his task, but the numbers available at so cheap a price give compensation.

Transportation of materials to the site of construction was one of the large problems of the work. On the British section the heavy earthwork near Pukow delayed the opening of rail communication to the line beyond and made necessary the shipment of much of the material by circuitous waterway routes to a point about 20 miles north, and from there it was distributed over the first 100 miles by way of small streams and by pack labor, wheelbarrows and carts, and also by construction trains. Heavy steelwork on the bridges usually waited until the track reached the site. On the German section, supplies for the mountainous, heavy portion, just north of the Grand Canal, were delivered at Yenchowfu over the grade from Tientsin and were then transhipped by way of the Grand Canal to Hanchwang. This canal is only 4 feet deep and its navigation is difficult and uncertain. The native wheelbarrows, for local transportation of a few miles, have quite a large capacity, as they are built with two balanced baskets one on each side of a large wheel, the weight being entirely on the wheel.



TIENTSIN-PUKOW RAILWAY. MAP OF SOUTHERN SECTION

Permanent Way and Stations

The permanent track construction is of 85-lb. rail laid on ties which are of creosoted Oregon pine over a part of the line and also of Japanese hardwood. The rail and most of the fastenings used on the British section are the product of the native iron works at Hanyang, near Hankow. On the German section they are largely of German manufacture. The track is laid in rock ballast over the greater part of the line, but in one part of the German section the ballast is of broken brick, made from local clay in kilns specially constructed for this work. The Chinese make brick in this locality, but the native brick is not burned hard enough to be serviceable.

The striking difference between the architectural character of the railway stations on the northern and southern sections of this railway is likely to attract the attention of all observant travellers. Those built under the direction and to the design of the German engineers are lavish in their ornamentation and florid in their design. whilst those erected by the British are plain to a degree. The two extremes are exhibited. The German stations are in many respects certainly handsome to behold, and the design is carried down to the out-buildings, the water towers, and even the pointsmen's huts. The roofs are of red tiles, and the design differs with almost every station, but in the main Chinese ideas have been utilised to leaven European notions, and the result is harmonious in most cases. The graceful curved gables of China have been adopted in most of the first class stations and give an effective finish. But all are infinitely too expensively built for the purpose they are destined to serve. On the other hand the British stations are plain brick buildings with galvanised iron roofs, and are entirely devoid of architectural embellishment. All of them, large and small, have been carried out to one standard design, and from the utilitarian point of view answer their purpose perhaps better than the buildings on the northern section. They conform more with their surroundings; are economical and serviceable. The gorgeous structures on the German section seem to be beyond the need at this stage of existence in China, and are incongrous when it is remembered that they are built not to conform with architecturally beautiful surroundings, but merely as the place of embarkation or disembarkation of Chinese passangers, most of whom live and have their being in mud huts or at most in houses of an inferior kind. They are, it is fair to say, too costly a luxury at a time when the standard of living is so low in the interior of China and when China could well utilise the major portion of the money they cost in other directions. The money could have been profitably employed had it been put into the permanent way or rolling stock or had it been saved to provide for the service and comfort of passengers on the trains. By that will the line be judged in the future.

Junctions and Branches

The junction points with other lines are at Tientsin Central, with the Peking-Mukden

Railway: at Tsinan-fu, with the Shantung-Tsingtao railway; at Pukow (by ferry), with the Shanghai-Nanking Railway; at Techow, with the projected railway to Chengting-fu; at Hsuchao-fu, with the projected Kaifeng-fu Railway extension; at Fenyang, with the projected Fenyang-Sinyang-chow railway, though this later is likely to be varied when the time comes for construction. The junction points with the branch lines are at Yenchow-fu, a short line of some 20 miles running to Tsining-fu, on the Grand Canal; and a Lincheng, (21 miles) running to Yihsien, passing the coal mines at Tsochuang. Another branch, which was the original starting section of the line, connects Liang Wang-cheng, on the main line, with Chen Tang-chuang on the river some 15 miles away.

NORTHERN SECTION

The northern section of the line, now running between Tientsin Central station (where it joins the Peking-Mukden line) to Hanchuang, on the southern boundary of Shantung province, is the product of German money and skill. It is 389.72 miles in length. Though the first sod was officially turned on June 30, 1908, actual work was delayed until August of the same year. It was then planned to carry out a section of 160 miles between Tientsin and Tehchow, and a commencement was made at Cheng Tang-chuang at a point on the Hai River some six miles below Tientsin, where a wharf was erected. The question of the site of the Tientsin station had been left undecided and was not finally settled until 1911, the scandal in connection therewith being mentioned above.

By January 10, 1910, about 70 miles of line were ready for traffic, and a trial trip to Tsang-chow was run on that date, a further, section being opened to Tehchow, an additional 90 miles, in April; whilst by October 28 a semi-weekly service was begun between Tientsin West and Tsinan-fu, the capital of Shantung province, the Yellow River being crossed by ferry. A steam launch was used to convey passengers from Tientsin Settlement to the railway station at Cheng Tang-chuang until the line was eventually opened to Tientsin Central. Progress was made to the south of the Yellow River in corresponding manner and within another year the whole line was carrying traffic, except for the crossing of the Yellow River, which was effected in October and put into service in December.

From Tientsin to the Yellow River there were no other engineering difficulties than the minor ones of bridge building. The country is practically level, and being almost an entire plain of alluvium and loess there is no hill to be seen and no stone to be found. The latter had the great disadvantage of compelling the engineers to seek other means of obtaining ballast and it was eventually decided to build brick kilns on modern lines. A brick kiln was erected for each section, and the product was used for various purposes and for ballast, thousands of coolies being engaged breaking the brick to the desired gauge. The estimated cost was $1.50 per cubic metre delivered at the track, and the life is calculated to be as long as that of ordinary stone. The ballast is deposited over a simple layer of brick bats to a minimum depth of 30 centimetres.



Q. F. CHEN

TRAFFIC MANAGER, NORTHERN SECTION, TIENTSIN-PUKOW RAILWAY

Approaching the Yellow River the embankment work increased and special care was necessary in construction to provide against exceptional floods. A waterway is provided about every third of a mile, and in addition to being of exceptional strength the sides are planted with shrubs and trees to retard the action of flood waters.

The line is, of course, of standard gauge (4ft. 8½ inches), and is single tracked throughout.

The limiting gradient is 1 in 150, with none between Tientsin and the Yellow River. After passing Tsinan-fu, however, hilly country is entered and there are several maximum grades.

The limiting radius of the curves is 500 feet, though such sharp curves occur only in a few instances. Most of the curves vary from 1,000 feet to 3,000 feet.

The width of the permanent way is 5.10 metres at the height of the upper face of the ties. The ties are of oak or other hardwood obtained mostly from Japan. The length of the ties is about 9 feet and they are laid at a distance of about 2 feet 5 inches apart at the joints.

The rails are 85 lb. and 4,820 tons were procured from the Hanyang Iron works, near Hankow.

On the section there are 257 steel spans with a gross length of 5,970 metres and a total weight in steel of 11,268 tons. The openings of the arch spans are reinforced concrete bridges, totalling 7,060 metres. The most notable bridges are:

Yellow River Bridge ...	1,244.4	metres.
Pei-ho bridge	160	„
Tsau Huang-ho bridge ..	235	„
Chi Hai-ho bridge	180	„
Sha-ho, No. 1 bridge	280	„
Sha-ho, No. 2 bridge	200	„
Pan-ho bridge	230	„
Ta Wen-ho bridge	360	„
Hsiao Wen-ho bridge	170	„
Chieh-ho bridge	270	„
Pai Sha-ho bridge	240	„





TIENTSIN-PUKOW RAILWAY—TYPICAL STATIONS ON THE NORTHERN (GERMAN) SECTION

The Yellow River Bridge, is of course, the greatest engineering feat on the whole line, and, as it was fully described in the FAR EASTERN REVIEW of October last, it is unnecessary to say more here than that it consists of nine 91.5 metre truss spans and three cantilever spans over the main channel, made up of two anchor arm spans of 128.1 metres and a central span of 164.7 metres. The total weight of steel in the bridge is 11,000 tons, of which 8,700 are contained in the superstructure. In the sinking of the masonry piers it was found impossible to rest them on solid rock so that reinforced concrete piles had to be driven, pneumatic caissons being used in and near the stream. As a protection against the current, fender-piles were driven around each pier and rock deposited between the piles.

The station buildings of this section are, as mentioned above, artistic. They are built either of brick or stone, with roofs of red tiles manufactured in the brick-yards of the railway. The buildings are generally situated on the level of the station platforms, which latter are the height of the car steps. Excellent loading platforms of earth supported by steel rails or concrete are provided at each station, the height being one foot below the floors of cars.

The main repair shops are at Tsinan-fu where there is a complete plant for repair and construction.

The rolling stock of the northern half is more elaborate than that on the south, and the accommodation on the passenger cars is better. The following is the list of stock:—

Number and type of locomotives:—10 3-3 coupled locos for shunting; 20 3-4 goods train locomotives; 20 3-5 passenger train locomotives. Total 50.

Number and type of passenger cars;—4 drawing room cars; 4 1st class coupé cars; 9 1/11 class composite cars; 16 2nd class cars. Total 125.

Number and type of service cars:—1 saloon car; 1 inspector car; 8 baggage vans; 3 heater vans: 4 breakdown vans; 6 crane cars; 1 standard weight car; 6 kitchen cars. Total 30.

Number and type of freight cars:—60 ballast cars 15-tons; 12 ballast cars 20-tons; 100 ballast cars 30-tons; 110 high side freight cars. (20-tons); 10 high side freight cars (24-tons); 190 high side freight cars (30-tons); 47 covered freight cars (15-tons); 47 covered freight cars (24-tons); 50 covered freight cars (30-tons); 10 timber cars (30-tons); 10 oil tank cars. Total 646. Grand total 801 cars.

Among the stock is a magnificent car for the Directors which cost 57,000 marks.

It was estimated that $1,050,000 would be expended during the three months of October, November and December of 1912 for construction and maintenance purposes on the Northern section. That would not of course complete the line. The estimated expenditure for September was $355,967.

Figures showing the cost of construction of the northern section are not yet available, but it is estimated that it will be something like £3,000 per mile more than the southern section, which is calculated to be £10,692 per mile.



C. T. SHAR

TRAFFIC MANAGER, TIENTSIN-PUKOW RAILWAY, SOUTHERN SECTION

COST OF CONSTRUCTION

The net cost of the Northern Section to November 30 was Kuping Taels 41,878,633, which is the equivalent of Taels 92,000 per mile inclusive of the Yellow River Bridge. The cost per mile exclusive of the Bridge is Taels 82,000. The total cost of the Bridge was Taels 4,564,357 and other bridges and passages cost Taels 7,539,884. Other items of expenditure were:—

	Taels
Earthwork	1,695,247
Superstructure on main line and stations	9,267,846
Stations and Buildings	2,149,471
Land Purchases	1,812,065
Rolling Stock	3,936,180
General Charges	3,368,490

SOUTHERN SECTION

Although the agreement for the construction of the line was concluded in January, 1908, it was not until September of the same year that a beginning was seriously made to set out the southern section of the line, the delay being primarily occasioned in making the necessary Chinese official appointments.

The preliminary survey which had been made for the Loan Syndicate was quickly shown to be capable of improvement and a much better route with easier gradients and curves of larger radius was ultimately found. Keeping in mind the necessity of obtaining a first class line suitable for large traffic the Engineer-in-Chief fixed the maximum grade at 1 in 150, and the radius of the sharpest curve at 2,000 feet, as against a ruling grade in the original setting out of the line of 1 in 100, and curves which were in some cases as small in radius as 1,000 feet—factors which would seriously have limited the weight and speed of trains.

Not only was a better route obtained but the line was materially shortened, though the result was not accomplished without considerable difficulty. In the 93 miles between Pukow and the Hwai river, in fact, 39 miles are of the maximum gradient, a proportion extremely high compared with most railways yet built in China. Beyond mile 93 the country is open and no particular difficulties marked the survey, though the position of the bridge across the Hwai River was a point of interest which had to be decided. The presence of quicksand and the knowledge that the bulk of the water in flood time left its course above where the crossing would have fallen on the direct route, at mile 92, east of the town of Lin-hwai-kwan, necessitated the selection of another crossing and the line was lengthened to obtain the advantage of rock foundations about mile 110, near the town of Pengpu, which has, by virtue of being close to the line and river, since developed an important trade.

It was at first arranged to commence the earthworks in some of the most difficult places in October, 1908, but as it was desired by the Peking authorities that the Director-General of Railways should cut the first sod in person, the work was delayed until January, 1909. Thenceforward construction went on until interrupted by the flood of that year and the revolution of 1911-12.

Owing to its position the railway suffered considerably. In November, 1911, when the first outbreak occurred on the Hwai River, several of the stations were looted, and much rolling stock was damaged. Later, when the Imperial forces retreated from Pukow they took with them a great deal of the rolling stock, holding it first at Hsuchow-fu, and later



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
AN EXAMPLE OF BRIDGE-WORK



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION.
ROCK CUTTING

at Yenchow-fu, in Shantung, where the cars were used as barracks for the troops until the latter half of 1912. Even ballast cars were withdrawn from service, and as there was also a curtailment of funds little progress was made during the nine months of trouble. For several months there was constant fighting and portions of the line lying between the contending parties had to be abandoned by the railway authorities. At Pukow one of the pontoons was sunk by shell fire and another was struck above the water line.

In addition to all this the construction period unfortunately coincided with a series of wet years. Three years in succession there were constant rains, and the terrible floods in the Hwai valley were followed by famine and pestilence, the fever introduced by the refugees being contracted by the workmen, hundreds of whom were at one time incapacitated from work. Despite these drawbacks, however, the 236½ miles of line were opened to through traffic to Tientsin in December, 1912, though a service to Tsinan-fu had been opened early in the year, the delay in establishing through connection with the north being due solely to



TIENTSIN-PUKOW RAILWAY—SOUTHER SECTION. PASSENGER LOCOMOTIVE

the construction of the Yellow River Bridge not having been completed until December of last year.

Progress of the Work

Difficulties of an aggravating kind had to be confronted at Pukow, the terminal on the Yangtsze river, opposite Nanking, at the outset, for the land thereabouts is so low that a veritable island had to be built upon which to erect the necessary stores and land material.



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. INSPECTION CAR BUILT ENTIRELY AT PUKOW SHOPS

The flat is in fact part of the Yangtsze river, for it is covered with water for about six months in the year; and the nearest high ground is about two and a half miles distant.

It was not until October, 1909 that a dry landing had been prepared, but in the meantime a temporary route, partly under water, was put through, and some materials and machinery were transported to the workshop site within the old city of Pukow, on the nearest high land. But having got out of the swamps there was not then a clear route into the country to enable material to be transported with facility, for the route lay through a hill which necessitated a cutting 1,000 feet long and eighty feet deep, most of it being rock. Rails could not be laid through this cutting until May, 1910, and before that time no transport of material by rail could be attempted.

A small canal served as a means to transport a little material, but the very heavy work in the first fourteen miles, consisting of the river bed, a series of big cuttings, and an embankment of about twenty feet high and five miles long, across a soft swamp, where the filling was extremely difficult, seriously hampered the construction work and kept back the transport of materials by at least a year, as compared with average country.

From mile 14 to mile 47, the country is broken, but except for numerous small bridges, and two large bridges over sandy rivers, where the foundations were very difficult, the work was not exceptionally heavy. The ballast for the southern portion of the line was obtained near mile 30, where a branch line is laid to the quarry.

Between mile 47 and mile 73 deep rock cuttings suceeed one another with bridges of considerable height between. The work was exceptionally heavy, the amount of rock excavated being approximately 200,000 *fang*. As the rock was unsuited for building purposes every bridge site had to be crossed by a temporary timber viaduct, some of which were of considerable size.

The Hwai River was reached by August, 1910, when transport of material by rail was possible, the river being used to take material as far as Kuchen, at mile 135.

Crossing the Hwai River, the railway passes through the districts noted for the terrible floods and famine in 1910-11-12. Portion of the country between mile 110 and mile 175 were under water for months, large areas being covered by water to a depth of 10 feet or more. It was fortunate that the railway was sufficiently advanced to be of service in the transportation of relief for the starving people, and during the spring of 1912 the trains were largely devoted to carrying famine relief.

From mile 170 (where there is a branch line leading to a lime stone quarry, from which



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. SLEEPING CAR CONVERTED AT PUKOW FROM COMPOSITE CAR DAMAGED DURING THE REVOLUTION

about 100 miles of railway have been ballasted) to Hsuchow-fu, there was no particular difficulty. It is interesting to note that the station at Hsuchow-fu is situated in the old bed of the Yellow River, which is much higher than the surrounding country. After passing Hsuchow-fu, a flat plain is crossed for a distance of about eight miles, and then a



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION. PUKOW WORKSHOPS INTERIOR VIEW



TIENTSIN-PUKOW RAILWAY—SOUTHERN SECTION, PUKOW WORKSHOPS

peculiarly rocky country is entered which necessitated three and a quarter miles of rock cuttings.

The bridge over the Hwai River (about 511 miles from Tientsin and 110 from Pukow) was completed on May 15, 1911. It consists of nine through riveted Pratt truss spans, each of 200 feet. and is 35 feet high in the clear above the average water level during construction. (See technical description below.)

On June 30, 1911, the first through train from Pukow, reached Hsuchow-fu. On October 20, the track laying of the southern section was completed, the rails reaching the Grand Canal in Shantung province.

A substantial road bed is a necessity on a Chinese trunk line, as the large quantity of freight obtained requires heavy trains to transport it, and these can only be drawn by powerful locomotives having necessarily a large axle load. Therefore, the track of both main lines and sidings, has been laid throughout with an 85lb. rail, and thoroughly ballasted with broken stone. The ties are creosoted Oregon pine over most of the line, and also of Japanese hard wood. The rails and most of the fastenings were made at the Chinese mills at Hanyang.

The total length of waterway on the railway is 22,947 feet, equivalent to 97 feet per mile of line, which is not surprising when it is remembered that the route runs parallel to the coast of a large continent. Altogether there are about 300 bridges and 500 culverts. The principal bridges are as follow:—

Hwai River bridge, 1,876 feet, in nine 200 feet spans.

Fei River bridge, flood opening 2,119 feet, in 62 spans of 30 feet.

Tse River bridge, 1,208 feet, in five 200 feet spans, and three fifty feet spans.

Huei River bridge. 925 feet, in one 200 feet span, and ten 40 feet spans, and ten 30 feet spans.

The bridges are all built of cement concrete or stone, with steel girders, no brickwork being made use of.

The workshops of the southern section are situated in a corner of the old City of Pukow. They are of moderate size, but laid out in the most up-to-date manner, so that they can deal with a great amount of work. They can, if necessary, be increased up to eight times their present size, without disturbing the existing arrangement. They were commenced in the spring of 1909, and the Foundry and Worshop were in working order before the end of February, 1910. Since then not only has all rolling stock been erected in the shops, but eight brake vans, and four Engineer's inspection cars have been constructed. Two passenger cars have been converted into sleeping cars.

Water tanks, water cranes, platelayer's trolleys, all castings required for the construction work, etc., have been made in these works, everything possible being made in China.

In the workshops, one foreign foreman is employed, but on the construction works elsewhere, Chinese foremen have been exclusively employed, and are found, under experienced Engineers, to be quite equal to all that is required of them.

The station buildings have been erected on a common design, without any pretence to ornamentation. the chief aim being to secure efficiency with economy. Some of the stations are not yet completed, precedence being given to the erection of godowns, for which there is a great demand and need. All the buildings have been made as simple as possible in accordance with instructions originally received from Peking. Many of the buildings will probably have to be augmented as time goes on, but the smallest are calculated to meet the needs of the next few years.

Cost of Construction

The cost of construction of the southern section works out at some £10,692 per mile, including rolling stock and equipment, and although £2,528,822 was expended to November 30, 1912, and the line is not yet completed, there is still sufficient to meet all needs and the cost will come within the original estimate of £3,969,730. It is only fair, when considering the cost in sterling to mention that the enormous difference between the actual expenditure and the estimate is to some extent due to the high rise in exchange, which makes the estimate appear larger than would have been the case had it been based on an average rate of exchange. And, if the funds originally arranged for are supplied, they will not only be sufficient to complete the line but also meet the cost of the extra amount of rolling stock, out of all proportion to that of most railways in China, necessitated by the extraordinary amount of traffic.

The following is a memorandum of cost to November 30, 1912:—

	£	£
Loan floated in London....	2,060,000	2,960,000
Discount on bonds and commuted profit on above...	247,000	.....
Actual amount credited to Railway	2,712,100	2,712,000
Loan made to German Section in 1911 and not yet returned	250,000	.....
Nett amount of Loans received by Southern Section	2,462,100	2,462,100
Advances from Loan Syndicate	173,000	.....
Total actual amount of Capital received by Southern Section	2,635,100	2,635,100
Cash Balances in Banks and Head Office	106,278	.....
Actual amount of Capital expended by Southern Section, to 30 Nov., 1912.....	2,528,822	2,528,822
Interest on Loan, and Bank Commission	473,084	
Interest received on Bank Balances	109,984	
Nett amount paid for interest	363,100	

The length of Main Line only, not including sidings quarry branches, etc., is 236¼ miles. The cost *per mile*, including rolling stock and all equipment, has therefore been up to the 30th November, 1912, £10,692.

The Engineer-in-Chief's estimate for the total cost of the Southern Section, was 24,612,321 Kuping Taels, equal to £3,969,730 so that there is ample margin for completion.

For comparison with the cost of Railways built by shareholders, and which do not pay interest during construction, the nett amount of interest, £363,100, should be deducted from the total; the cost then works out at £2,165,722 or £9,157 per mile.

The following are the revenue earnings for the southern section for:—

October.....	$229,000
November.....	226,000
December.....	235,000

The work of construction was carried out under the supervision of Mr. T. W. T. Tuckey, M. Inst. C. E., Engineer-in-Chief.

THE HWAI RIVER BRIDGE

Allusion has been made in several places in the foregoing article to the Hwai River Bridge, and as the work of construction supplied a very interesting demonstration of bridge building under difficulties, we append some technical notes, with acknowledgments to the *Engineering Record*:—

Foundation Conditions.—The single-track bridge is 1,885 ft. long over all and about 35 ft. high in the clear above the average water level during construction. It has nine through riveted Pratt truss spans 200 ft. long over all, which are supported on two masonry abutments with concrete footings and pile foundations and eight concrete piers with rock foundations within the flood channel. At the bridge site the surface of the rock varies from about 83 to 19 ft. below mean low water level and is covered with clay and mud up to a depth of 60 or 70 ft., except under spans 4 and 5 and portions of adjacent spans across the low water channel, where it is scoured nearly or quite bare. The heights of the piers vary from 50 to 111 ft. and they have uniform dimensions of 9 × 31½ ft. under the coping.

Operations at the site were commenced about Dec. 18, 1909, at the beginning of the low water period following the highest summer flood recorded in many years The abutment excavations, well outside the flood line, were only 10 or 15 ft. deep and were easily made without sheeting, and the foundation piles were driven in them by a 2,000-lb. hammer operated by a hand windlass. The work was slow, but on account of the high price of coal and the small price of labor it was considered economical and satisfactory. After the completion of the footings the abutments were built as rapidly as the ashlar masonry was delivered from the local quarries and were finished on Aug. 15, 1910, and Jan. 15, 1911.

Piers 1, 2 and 3 are located beyond the low water shore line where the rock is not very far below the surface, and were built in open excavation, sheeted where necessary to retain the sides and exclude the water. Pier 3 is located on a rock reef in the channel near the south bank of the river, which was exposed at low water. Work on it commenced Dec. 14, 1909, and was completed March 15, 1910, without difficulty, the excavation being carried to a depth of 21½ ft. below mean low water level through clay and rock without the necessity of timbering.

Excavation for Pier 2 was commenced in December, 1909, and was completed March 15, 1910, at a depth of 33½ ft. below mean low water level. After concreting was commenced a flood submerged the pier site to a depth of 10 ft. and delayed the work until December, 1910, when it was resumed and completed in February, 1911.

Pier 1 was excavated 36½ ft. below mean low water and 49 ft. below the surface of the ground through fine running sand, for which sheeting and heavy timbering were necessary. The excavation was very much delayed by the March flood, which, although it did not overflow the bank, caused a serious influx of sand. Soon after rock was uncovered the pit was filled by the flood and work was abandoned for about a month and finally completed about ten months after commencement.

Pneumatic Foundations.—Piers 4 to 8 inclusive have foundations on steel pneumatic caissons sunk from 22½ to 45½ ft. below mean low water level. The caissons, from 10 to 50 ft. high, are 16 ft. wide and 38 ft. long with rounded ends and have an inner shell 4 ft. from the outer shell and connected to it by vertical lines of zig-zag transverse bracing about 3 ft. apart, and by the inclined side walls of the working chamber, 8 ft. high, which reach from the cutting edge to the bottom of the inner shell. They are made chiefly of steel plates from 5/16 in. thick at the cutting edge to ⅜ in. thick at the top, with lapped joints hand-riveted and calked.

As the sites of piers 7 and 8 were above water level when operations were commenced, their caissons were assembled wholly in the required horizontal positions resting on the surface of the ground and were excavated and sunk without guides or falsework. They were 10 ft. in height and the concrete below the footing was reinforced by 32 vertical lines of ½ × 4 in. steel bars.

The sites for piers 4, 5 and 6 being submerged at all times, their caissons were partly built on

shore, and, after the working chamber and a few feet of the cofferdam walls above it was riveted and calked, they were floated to position and the upper parts of the walls were added as the caissons were sunk.

The construction of the caissons was commenced by assembling the cutting edge on horizontal blocking or launching skids and riveting to it the inclined walls of the working chamber which, when braced across the top, were independently stable. The deck and the inner and outer shells were then successively added, the steel plates being handled by guyed derricks and the rivets being driven by hand.

Work was commenced first on the caisson for pier 7, which was started Dec. 15, 1909, as soon as possible after the receipt of the first air compressor. Sinking under air pressure was commenced Jan. 7, 1910; rock was reached at the end of March, soon after which the pier was submerged by the spring flood and work was suspended until May 29. The concreting of the working chamber was completed June 15, when, the top of the pier being still submerged, work was suspended until Nov. 15. Then an earth cofferdam was built around the pier, the shafts pumped out and the pier completed up to the coping on Dec. 5.

Three more air compressors, which, like the first, had each a capacity of 220 cu. ft. of free air per minute, were supplied by the Imperial Railways of North China and, being delivered like the rest of the machinery by junks through the Grand Canal, arrived piece by piece at intervals. They were installed on the north bank of the river near pier 8, and as their capacity was adequate for only two caissons at once, the sinking of the other piers could not be commenced until 7 and 8 were finished.

Work on pier 8 was commenced in the latter part of February, 1910, and was prosecuted continuously until the caisson was landed 4 ft. below the surface of bed rock in the end of June, and the pier was completed to the coping on Aug. 16, 1910. The cutting edge was sunk 68 ft. below mean low water, or 90 ft. below the surface of the ground. The caisson work was executed in four-hour shifts and there were two deaths due to air pressure. This caisson was founded during high water at a depth of 88 ft. below water level and required a maximum pneumatic pressure in the working chamber of about 40 lb.

Pier 5 is located in the river channel where the water is 30 ft. deep at its lowest stage. The river bottom here has an uneven rock surface scoured clean by the swift current. The caisson was built on shore to a height of 20 ft. above the cutting edge and, weighing about 50 tons, was rolled on the launching ways to water about 4 ft. deep and delivered to a 22 × 60 ft. wooden tower about 20 ft. high. The tower was mounted on two wooden pontoons, one on each side of the caisson, which was suspended from it by four vertical screws 4 in. in diameter and about 8 ft. long. The screws were attached at their lower ends to steel links 4 in. wide, ½ in. thick and 3 ft. long, and at their upper ends engaged capstan nuts in two overhead king-post lifting trusses in the tower.

The air space between the walls of the caisson provided considerable buoyancy, and after the screws were adjusted to transfer a small portion of its weight to the tower, the caisson was towed, partly suspended and chiefly floating, to approximate position, where it was held by six 2 in. Manila tackles running to upstream and downstream anchors.

The anchors were T-shape in plan with a stem made of two 85-lb. rails 30 ft. long spaced about 12 in. apart by means of timber blocks and a cross-beam to prevent overturning, made of a third similar rail. Inclined slightly from the vertical and bolted securely at the intersection of the stem and crossbeam were two hardwood cross-ties. These were sharpened at the lower end and projected about 18 in. below the bottoms of the rails so as to embed themselves in the river bottom. The anchor rope was attached to the long end of the stem. This device proved efficient and satisfactory for mooring purposes to maintain the caisson in position in the strong current. A crew, however, was constantly employed on the pontoons to look after the anchorage in case of emergency.

The caisson suspension links were pin-connected at their lower ends to two horizontal transverse plate girders built into the caisson just above the roof of the working chamber and projecting through the outside wall. These girders stiffened the caisson without injuriously obstructing the interior, and, being sufficiently far below the surface of the water not to obstruct navigation when the caisson was landed, were allowed to remain permanently in the work.

As soon as the caisson was moored, hand-mixed concrete was filled in between the shells. The concrete was made of Green Island Portland cement manufactured near Hongkong, broken stone 1½ to 2 in. in diameter and local sand delivered in boats from pits about 10 miles distant.

Sinking was commenced at the end of February, 1910, and successive courses of the wall plates were added as the caisson descended, At the end of May it was landed on rock in water 50 ft. deep, the screws were detached and the pontoons and tower floated away. The pier footings were established below the lowest water level so that they would not be exposed at low water. At this level the inner shell was discontinued and a detachable joint was provided for the upper part of the outer shell, which, after the completion of the pier, was removed by unscrewing the long bolts which projected above the surface of the water. For this detachable section of the cofferdam interior timber bracing was provided.



THE HWAI RIVER BRIDGE, ON SOUTHERN SECTION TIENTSIN-PUKOW RAILWAY (1,876 FEET IN LENGTH—9 SPANS OF 200 FEET)

The use of long lowering screws was avoided by the combination of screws and links. By lowering the caisson until the links were sufficiently slackened one of the suspenders at a time could be disconnected and the screw varied sufficiently to permit a new set of links to be added.

The 4 in. air main from the compressor was supported for about 200 ft. on a raft of 12 × 12 in. timber where the water was so deep and the bottom so rocky that piles could not be driven. This raft was held in position by anchors placed about 20 ft. apart. Inshore, where the water was shallow and there was sufficient earth for pile driving, the pipe was supported on a light pile trestle, and for pier 4 the compressors were moved to the opposite bank of the river.

On Aug. 13, the air locks were submerged by a summer flood which also submerged the derricks and other plant, but did not carry away anything of importance. Excavation was resumed Sept. 16, sinking was completed early in October and the working chamber filled with concrete prior to Oct. 15 and completed to the under coping early in February, 1911.

Pier 4 was built, launched, and towed into position and lowered in the same manner as pier 5. It was landed on the river bottom early in October, excavation was commenced in November and was completed in the latter half of December and the pier was finished to the coping early in March, 1911.

The caisson for pier 6 was built on shore to a height of 12 ft., launched on a boat and towed to approximate position and landed there on a temporary deck under a tower on a pile foundation that was built in December, 1909. The caisson was delivered and sinking through the mud was commenced in February, 1910. The work was submerged during the March flood and was resumed in June. The caisson was lowered during July, again abandoned on account of the August flood and work on it was resumed in September. Air pressure was put on in November, the caisson was landed on rock in the end of February, 1911, and the pier was completed to the coping at the end of March.

Each caisson was provided with two air shafts 3 ft. in diameter surmounted by air locks of a special type previously used by the Imperial Railways of North China. The locks were about 8 ft. long, 8 ft. high and 4 ft. wide, with dome-shaped tops and bottoms and vertical cylindrical sides and were made with three chambers. The front or entrance chamber was provided with an interior and ex erior door. The interior door opened directly into the central chamber, which was provided with a circular opening directly over the shaft. The back of the central chamber was provided with a rectangular opening into the rear chamber. The hoisting drum was located on the inside of the central chamber directly under the roof and the drum shaft passed through the wall of the lock and was operated by a steam hoisting engine fastened to the outside of the central chamber. The rear chamber was fitted with a muck chute provided with quick-acting locks. The muck kibbles were swung through the rectangular opening between the central and rear chambers and dumped into the muck chute.

After the caisson was landed a concrete chute with quick-acting locks was placed in the roof of the central chamber. The concrete was mixed by hand, carried in baskets by coolies and dumped into the concrete chute. An incline was provided leading from the mixing board to the concrete chute.

Falsework.—The superstructure, weighing about 2,500 lb. per linear foot, was all erected on pile falsework with bents at panel points about 25 ft. apart, made of piles long enough to serve without the addition of framed bents above them. Each regular bent had five 12 × 12 in. vertical posts spaced 6 ft. center to center and capped by a 12 × 12 in. timber 30 ft. long.

The bents had a 6 × 12 in. transverse strut at the water level and were X-braced in the panel above the water level. Longitudinally they were braced by three lines of 6 × 12 in. horizontal ledger pieces bolted to the intersections of the transverse brace with the center and outside piles. At the ends of the span these ledger pieces were supported on and thoroughly bolted to 12 × 12 in. horizontal timbers bolted across the faces of the pier, to which they were secured by five 1 in. bolts passing through the piers and removed when the falsework was taken down.

The bents supported five lines of stringers on the center of the piles. The two outside lines were single 14 × 14 in. timbers to carry the traveler track. The other were single lines of 12 × 12 in. timbers lapping joints on the caps. The rail stringers were spliced at the joints with 6 × 12 in. fish plates and were

continuous across the tops of the piers, to which they were firmly secured by pairs of ¾ in. wedge bolts. The rail stringers were fastened to the caps at each intersection with ¾ in. nailing bolts. All timber for falsework and all other purposes was Oregon fir, imported in large sizes and sawed by hand at the site.

Where the water was very deep piles were made of two pieces spliced with butt joints and fish plates, and for spans 5 and 6, where the water had a maximum depth of 40 to 50 ft., they were made of 14 × 14 in. timbers. Here the rock bottom was uncovered, and the piles were provided with forged steel points and driven to penetrate in the soft surface of the rock. Rails were bolted to these piles to prevent them from floating and they were temporarily stay-lathed to maintain them in position until a system of permanent bracing could be put in.

Additional stability was provided by bracing each bent in these spans with 14 × 14 in. spur piles inclined 1:4 and driven by a drop hammer running in inclined ways, which moved on top of the falsework. The spur piles were not driven in the plane of the bent, but adjacent and parallel to it, and were bolted across the faces of the vertical piles, intersecting the outer pile at the water level and the adjacent intermediate pile at the cap. The stringers carrying the bridge floor rested directly on the heads of the spur piles.

In these spans the caps were secured to the piles by wooden scabs, and the panels between them were X-braced by 6 × 12 in. horizontal timbers. All falsework connections were made by ¾ in. bolts. The piles were driven by several floating machines built by the engineer in charge and equipped with 2,000 lb. hammers operated by hand. Each machine required a crew of men.

Erection of Steel.—The steel was stored in the yards at both ends of the bridge and was skidded on greased rails by manual labor to standard-gauge push cars and erected from them by two travelers, working out from the abutments at both sides of the river. Each traveler had an ordinary gallows-frame about 40 ft. high and 45 ft. long over all, made of two 12 × 12 in. vertical posts 24 ft. apart, two 10 × 10 in. inclined posts and a 9 × 18 in. cap. It was seated on two 12 × 12 in. longitudinal sills 25 ft. long, to the ends of which it was braced by 12 × 6 in. diagonals reaching nearly to the cap and giving it longitudinal stability. It was mounted on eight 10 in. double flange wheels running on the 24 ft. gauge track, and was provided with two eight-part Manila rope tackles suspended from the caps and operated by hand windlasses manned by eight men each, which easily lifted the maximum weights of about 6 tons which were imposed by the top chord pieces.



A GENERAL VIEW OF THE HWAI RIVER BRIDGE

Cross pieces of 12 × 12 in. timber were laid on the falsework stringers at panel points and on them the traveler set the 36 in. I-beam floorbeams on pairs of camber wedges and assembled to them the I-beam stringers. After the floor system was completed the traveler assembled the lower chords to the floor beams and then erected the vertical posts and inclined posts, which were temporarily stable on account of the rigidity of their bolted connections to the bottom chords. The top chord pieces were then assembled into position on the web member, transverse braces added and the field rivets driven by about 20 gangs of four men each.

The erection of span 1 was commenced early in December, 1910, immediately after its delivery at the bridge site, and was completed in the same month. The erection of span 9 was commenced late in December, 1910, and completed Jan. 18, 1911. The entire superstructure, with permanent decking, was completed and opened for construction traffic on May 15, 1911.

The bridge was erected before the granite pier coping 2 ft. thick was set, the trusses being temporarily supported on cribbing placed on top of the concrete. After the superstructure was erected the coping was delivered at night on the service track on the bridge floor and after it was set the pedestals were placed on it and the spans lowered to permanent bearing on them.

The principal quantities in the work include 5,556 cu. yd. of concrete footings in the piers and abutments, 4,074 yd. of concrete in the piers above the footings, 385 yd. of granite pier coping, 556 yd. of granite ashlar in the abutments, 10,600 barrels of cement and 2,500 tons of steel. The steel was fabricated by Wright, Headson & Company, Ltd., of Motherwell, Scotland.

All work was done by native labor under Chinese foremen, many of them trained on similar work in North China, who proved to be excellent workmen. The foreign staff under whose direction the work was performed consisted of Mr. T. W. T. Tuckey, M. Inst. C.E., engineer in chief; Mr. T. J. Bourne, M. Inst. C.E., executive engineer of the second district, and Mr. E. B. Naylor, M. Am. Soc. C.E., engineer in charge of construction.

HEMP IN THE PHILIPPINES

A Shortage Predicted

According to a Manila paper of December 6, M. F. Loewenstein, president of the Pacific Commercial Company, predicts that there will be a shortage of hemp next year. He had just returned from a trip through the hemp districts of southern Luzon and he based his observations on what he saw and reports from correspondents in other hemp producing districts.

"Unquestionably the drought which the islands experienced in the early part of the year did a great deal of damage to the hemp fields of southern Luzon," he said. "Opinions differ as to the extent of this damage. Weather since July has been ideal for the growing of hemp and but for the fact that considerable over cleaning has been indulged in there would probably not be much of a falling off in receipts next year.

"In anticipation of the drought and due to the very extraordinary consumption of hemp throughout the world, prices commenced advancing in July until they practically doubled. Owners, and the laborers stripping hemp, who in lieu of pay receive 50 per cent. of the hemp stripped, had been accustomed to ruinous prices for the last three years. When, therefore, values advanced they could not withstand the temptation to strip most of the hemp which was fit for cleaning regardless of consequences in order to take advantage of these high prices. Thus they discounted the future and it is due to this fact that receipts of hemp at Manila and Cebu instead of declining during the past three months, as had been expected, showed an increase of 118,517 bales as compared with last year.

"However, there is bound to come a time of reckoning and the general opinion is that it will come next year, principally during the first six months. No estimates are alike as to the shortage which may be expected. The most conservative people I met in southern Luzon insist it will be 25 per cent. whereas estimates go up all the way to 40 and 50 per cent. Southern Luzon, namely Ambos, Camarines, Albay and Sorsogon, produced last year about 600,000 bales, and figuring conservatively it is, therefore, safe to assume that the shortage will not be less than 150,000 bales from that quarter.

"The typhoon of October 16th in southern Leyte destroyed to a very considerable extent what hemp had escaped the drought in that district and it is most likely that the shortage there will amount to 100,000 bales.

"According to the advices of our representatives in that part of Samar which was lately hit by a typhoon a good deal of over cleaning has been going on as well, so that even if this typhoon had not done considerable damage there would probably be less hemp from there during the coming years.

"Just what damage the last typhoon has done I am unable to state but in view of the above observations it is safe to predict that the production of hemp next year will not exceed 1,110,000 bales which is considerably less than the world's requirements have been during the last three years."

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THE HONGKONG AND SHANGHAI BANKING CORPORATION

We hold no brief for the Hongkong and Shanghai Banking Corporation, but we feel that, in common justice, some allusion should be made to the recent attacks upon the Bank by certain members of the British House of Commons and some of the London financial papers. Attacks made by persons such as Mr. Ginnell, M.P., are not likely to be seriously regarded by those who know the explanation of Mr. Ginnell's interest in Far Eastern matters, but the majority are not aware of the source of Mr. Ginnell's inspiration and the strictures passed upon the Bank have apparently found acceptance in certain quarters. The charge against the Bank, when analysed, resolves itself into the assertion that, while it claims to represent British finance in the Far East, a large percentage of its Directorate are German subjects. The suggestion is, of course, that the policy of the Bank is influenced by the fact that Germany is represented in the Court of Directors.

In these days, when the internationalizing of finance is the accepted policy, a complaint of this kind simply betrays the parochialism of those by whom it is presented. When the Hongkong and Shanghai Banking Corporation was established the volume of business being transacted in the Far East by British firms was insufficient to justify the inauguration of the expensive machinery of administration necessary to cover the large area in which the Bank proposed to operate. It was, therefore, decided that seats on the Board should be offered to the heads of certain great German firms, and the adoption of this policy has been entirely justified by the results. Very properly, the Bank regarded the situation from a commercial and not from a political standpoint. Its object was to supply the Far East with adequate banking facilities, which were sadly lacking in the middle of last century, and it adopted the commonsense policy of securing the business of the best clients, irrespective of any consideration of nationality. The adoption of this policy has placed the Bank in the position it occupies to-day. No charge of sacrificing any material British interests can be laid against the Bank. When everything is considered the Hongkong and Shanghai Banking Corporation should be congratulated rather than condemned for the part it has played in divorcing commercial and political matters in regard to China.

The attacks to which we have alluded were largely caused by the feeling aroused in connection with Mr. C. Birch Crisp's disastrous incursion into Far Eastern finance. That deplorable departure on the part of China from the policy of above-board financing has cost her more than is immediately to be realized, and it led the partizans of the loan into hurling abuse at everyone connected with the Six Power Group and everyone who spoke in favour of international financing in China. Now that the stupendous error committed by China and those who were associated with the Crisp adventure has been tacitly admitted, it is to be hoped that the persons and papers who showered abuse upon the Hongkong and Shanghai Banking Corporation and others, will have the grace to admit that their charges were made from prejudice and were not based on established facts. Whether they do or not, that will be the judgment of the unbiassed general public. The fact that the Chinese Government turned to the Six Power Group to help it through speaks for itself.

CHINESE CUSTOMS REVENUE

It was anticipated by very few that the Revenue from the Chinese Maritime Customs for the year 1912 would show any increase at all, much less one so considerable as Hk. Tls. 3,800,000. Reports from commercial sources suggested that, as a result of the uncertainty following the Revolution and the failure of the Government to win recognition from the Powers, coupled with the unfortunate methods of financing that obtained temporarily, there would be a falling off in the Customs Revenue instead of an increase. The figures are extremely gratifying, not only to the Chinese, but to all whose interests are bound up in the fortunes of this country. The proof that China possesses considerable recuperative power has been strikingly demonstrated.

It is noticeable that the increases were practically general, although there was a slight falling off at Shanghai and at some ports in Manchuria. The remarkable increase of Tls. 771,000 was shown at Hankow, and the other Yangtsze ports were responsible for Tls. 1,077,000. Kiaochow made a good show with Tls. 419,000 and Swatow with Tls. 444,000. Canton's increase was only Tls. 290,000, possibly caused by the unsettled conditions in the Two Kwang Provinces. Tientsin and Chingwantao retained the second place, with a total of Tls. 3,776,000, an increase of Tls. 156,000.

While China is still far from being out of the financial wood, this unlooked for increase in the Customs Revenue should inspire her to face her problems with a greater confidence. Given firm administration and sound financing during the present year, there is no reason why she should not now enter upon a period of great development.

RAILWAY EARNINGS IN CHINA

Necessarily it will be some time before it is possible to give accurate periodical returns of the earnings of railways in China, but it will be seen elsewhere in our columns that we have been able to give a considerable amount of information in this connection. In the near future, when the reorganization now being carried out by the Board of Communications is complete, we hope to be able to supply this information in regular form. There is every reason to suppose, unless something now unforeseen occurs that the earnings of the existing railways during 1913 will show a progressive increase.

The management of the Peking-Mukden line have much to congratulate themselves upon in respect of the result of last year's working. The earnings totalled $13,124,000, which is a record, whilst the working expenses were less than a third, some 32%. There was an all round increase in traffic and the demand for transportation seems to be a sustained one, for the management are hopeful of making further records by this year's operations. The 1912 results have not been approached before except in 1905, when the Russo-Japanese war was on, and that might be classed as an abnormal time, whilst 1912 was normal.

We understand that it is contemplated to improve the passenger cars on this line. In fact there is a general demand for more rolling stock throughout the country, and if it is complied with the total railway earnings are likely to show an all round increase.

U. S. RAILWAY RECEIPTS AND EXPENSES FOR SEPTEMBER

The business of the railways of the United States of America for September while showing a considerable improvement over that of September 1911, does not maintain the rate of increase set by the record-breaking month of August. The total net operating revenue of 90 per cent. of the steam railways increased $5,896,840 for September, while the increase for August was $13,865,622. This increase in net operating revenue was at the rate of $21 per mile of line for the month or at the rate of 70 cents per mile of line per day.

The total operating revenues per mile of line for the month increased 6.5 per cent., the operating expenses 7.3 per cent. and the net operating revenue 5.1 per cent.

The foregoing statistics are from the summary made by the Bureau of Railway Economics from the reports of the railways to the Interstate Commerce Commission. A special committee of the railways having headquarters in Chicago reports that bills now pending in the Federal Congress providing for an increase in the number of employees of the railways and for the rapid substitution of steel for wooden equipment will, if enacted, place the railways under an additional expense of approximately $12,000,000 per annum for the former, and a total expense of $632,746,000 for the latter purpose. Without compulsion, the railways in the course of three years have increased their steel equipment 750 per cent. and their steel underframe equipment 256 per cent.



THE ABOVE PHOTOGRAPH OF PRESIDENT YUAN SHIH-KAI IN COMPANY WITH THE AMERICAN AND JAPANESE MINISTERS WAS TAKEN ON JANUARY 2, WHEN THE PRESIDENT HELD A RECEPTION AT HIS YAMEN, AT PEKING. MOST OF THE FOREIGN MINISTERS ATTENDED, BUT THE PHOTOGRAPH HERE SHOWN WAS TAKEN AT THE CONCLUSION OF THE RECEPTION, AFTER THE OTHER MINISTERS HAD DEPARTED, AND UPON THE SUGGESTION OF ONE OF THE GUESTS. IT DOES NOT IMPLY IMMEDIATE RECOGNITION OF THE REPUBLIC!

CHINA'S BUDGET

Estimates for January-June, 1913

REVENUE

With the re-establishment, to some extent, of orderly conditions it has been found possible to compile the Budget for the first half of the second year of the Republic. The total revenue is estimated at $51,336,879,96, made up as follows:—

(1) Board of Foreign Affairs	$ 18,440.00
(2) Board of Finance	2,679,169.30
(3) Board of Education	89,912.02
(4) Board of Agriculture and Forestry	14,530.97
(5) Board of Communications and Posts	276,280.00
(6) Total Revenue of provinces to be remitted to Board of Finance	18,551,846.07
(7) Total Revenue from various Maritime Customs	29,706,701.55

EXPENDITURE

The estimated expenditure of the various Boards in Peking during the period in question is as follows:—

	Expenditures *Ordinary*	Expenditures *Provisional*
Board of Foreign Affairs	$ 1,579,355 60	$ 458,787
Board of Interior	1,835,190.81	300,500.64
Board of Finance	6,948,848.76	3,867,103.19
Board of Education	2,238,801.00	4,048,850 00
Board of War	?	?
Board of Navy	1,724,954.00	8,229,250.00
Board of Justice	740,448.40	361,587.00
Board of Agriculture and Forestry	1,369,228.12	1,545,325.00
Board of Industry and Commerce	13,319,656.00	110,000.00
Board of Communications and Posts	437,431.74	102,066.00
	110,193,914.43	19,018,468.83

This shows a shortage of $77,875,503.

LOAN EXPENDITURE

In addition to the ordinary expenditure there are the foreign and domestic loan obligations which have to be met in the first half year of 1913. These amount to $79,199,844.91, made up of the following sums:—

A.—(1) Foreign Loans—Shanghai Tls. 38,150,00—£2,823,-946-3-4 Fcs. 5,556,905.-00=		$32,951,467.00
(2) Indemnity Loan—Haikwan Tls. 9,949,-650.00=		16,118,433.00
(3) Provisional Advances from the Group, Shanghai Tls. 12,800,000=		17,645,600.00
(4) Foreign Short Period Loans contracted by the Central Government		10,044,342.00
	Total	$76,759,842,00
B.—(1) Domestic Short Period Loan		$1,090,475.00
(2) Domestic Public Loan		1,349,527.91
	Total	$ 2,440,002.91

THE TIBETAN QUESTION

OFFICIAL CORRESPONDENCE BETWEEN GREAT BRITAIN AND CHINA

We publish herewith the full text of the Note sent by the British Minister at Peking to the Chinese Government on the question of Tibet, and we give a fairly accurate translation of China's reply, as well as the text of the semi-official letter to Sir John Jordan, which was written in an endeavor to bring the question up for discussion.

China delayed for several months in replying to the British note, and then set down conclusions which the British deem as finally disposing of the question so far as China is concerned. Meantime Tibet has severed herself entirely from China's influence, and it is difficult to tell how China is going to reassert herself if Britain determines to have nothing more to say to her, and confines her activities to negotiations with the Dalai Lama. It would appear to the unprejudiced that China might have left a loophole in her reply through which to escape, but the British fail to admit of one, and at present seem determined to consider the subject one upon which they need not again bother the Central Government. It is rather unfortunate that the Government did not take counsel with the Adviser at their service, who intimately knows, perhaps better than any other man, the thorny paths of foreign diplomacy.

The correspondence is as follows:—

COPY OF BRITISH NOTE

PEKING, August 17, 1912.

In a conversation with His Excellency Yuan Shih-kai on the 23rd of June His Britannic Majesty's Minister referred to the Chinese Military Expedition which was being organised against Tibet and gave His Excellency clearly to understand that the Tibetan question could be easily settled by friendly negotiation at a later date but that the use of force at that time would seriously prejudice an amicable arrangement. His Excellency Yuan Shih-kai assured Sir John Jordan that there was no intention of incorporation in China and that the treaties would be scrupulously observed.

On June 29 His Majesty's Minister informed Mr. Lu Cheng-hsiang that His Majesty's Government would not tolerate any attempt to reduce Tibet, who had an independent Treaty with Great Britain, to the condition of a province of China and he warned the Chinese Government that grave complications might ensue if the Chinese expedition crossed the frontier into Tibet.

In consequence of a visit paid to him a few days previously by the Vice-Minister of Foreign Affairs, His Majesty's Minister again saw His Excellency Yuan Shih-kai on the 16th instant and, in reply to his inquiry, received the most emphatic assurance that there was no intention either of sending the expedition to cross the frontier into Tibet or of incorporating that country in the Provinces of China. These assurances have been noted and duly reported to His Majesty's Government who will doubtless welcome them as indicating China's intention scrupulously to observe Treaty engagements. At the same time His Majesty's Government consider it to be in the interests of harmonious relations that they should now state clearly their policy in regard to Tibet. His Majesty's Minister had the honour to inform His Excellency Yuan Shih-kai that a communication in this respect would shortly be submitted to the Chinese Government and he now begs, under instructions from Sir Edward Grey, to make the following definite statement of that policy.

(1) His Majesty's Government, while they have formally recognised the suzerain rights of China in Tibet, have never recognised the right of China to intervene actively in the internal administration of Tibet which should remain, as contemplated by the Treaties, in the hands, of the Tibetan authorities, subject to the right of Great Britain and China, under Article 1 of the Convention of April 27, 1906, to take such steps as may be necessary to secure the due fulfilment of Treaty stipulations.

(2) On these grounds His Majesty's Government must demur altogether to the conduct of the Chinese officers in Tibet during the last two years in assuming all administrative power in the country and to the doctrine propounded in His Excellency Yuan Shih-kai's Presidential Order of the 21st of April, 1912, that Tibet is to be regarded as pien an equal footing with the provinces of China Proper, and that all administrative matters connected with that country will come within the sphere of internal administration."

His Majesty's Government formally decline to accept such a definition of the political status of Tibet and they must warn the Chinese Republic against any repetition by Chinese officers of the conduct to which exception has been taken.

(3) While the right of China to station a representative, with a suitable escort, at Lhasa, with authority to advise the Tibetans as to their foreign relations, is not disputed, His Majesty's Government are not prepared to acquiesce in the maintenance of an unlimited number of troops either at Lhasa, or in Tibet generally.

(4) His Majesty's Government must press for the conclusion of a written agreement on the foregoing lines as a condition precedent to extending their recognition to the Chinese Republic.

(5) In the meantime all communication with Tibet via India must be regarded as absolutely closed to the Chinese and will only be re-opened on such conditions as His Majesty's Government may see fit to impose when an Agreement has been concluded on the lines indicated above.

This does not apply to the withdrawal of the present Chinese garrison at Lhasa, who, as His Excellency Yuan Shih-kai has already been informed, are at liberty to return to China, via India if they wish to do so.

Sir John Jordan has the honour to request the Wai Chiao Pu to favour him with a reply to this memorandum.

(Sd.) J. M. JORDAN.

REPLY FROM CHINA

The Chinese Government, did not reply to British memorandum until December 23, 1912, when a Note was sent to the British Legation giving a categorical reply to the demands. The note takes a firm stand upon the existing Treaties. It attributed the precipitation of the Tibetan question to a misunderstanding on the part of England of the policy of the Chinese Government toward Tibet.

After citing Article 2 of the Tibetan Convention of 1906 between China and England, the Chinese Note emphasized the fact that it was England which had engaged "not to annex Tibetan territory or to interfere in the administration of Tibet;" that China had merely undertaken "not to permit any other Foreign State to interfere with the territory or internal administration of Tibet," and that no express stipulation was found in the treaty which restricted China's right of administering Tibet. It also pointed to the various obligations which the Trade Regulations of 1908, for instance, imposed upon China, such as the policing of the trading marts and the protection of the lines of communication between Tibet and India, as evidence of her right of interfering in the Tibetan administration.

Referring to the statement found in one of the Presidential Orders to the effect that "the five races of the Republic should be united into one family,"—a statement to which the British memorandum took exception on the ground that such union would eventually bring about the conversion of Tibet into a Province,—the Chinese note says that, as has been repeatedly declared by the President, China has no intention of converting Tibet into a Province China's Tibetan policy, adds the note, is governed by the Provisional Constitution of the Republic, the Edict of Abdication of Emperor Hsuen Tung, the President's Inauguration Oath and his Order restoring his former title and position to the Dalai Lama. The "union of five races into one family" and the conversion of Tibet into a Province are two entirely different things. That the present status of Tibet should be preserved and no change introduced into the traditional system of government therein is as much the desire of China as that of Great Britain.

The Chinese Government also maintained in the Note that the right of despatching troops to Tibet was a necessary complement of the responsibility which it had undertaken by treaty with Great Britain to enforce due observance of the Convention of 1906, and the Regulations of 1908 by the Tibetans, and to preserve peace and good order throughout the vast territory of Tibet. As a matter of fact, only such a body of troops was despatched to Tibet as was absolutely necessary to aid the police in enforcing law and order there: the Chinese Government had never entertained the idea of stationing an unlimited number of soldiers in Tibet.

To the demand of the British Government to negotiate a new Tibetan Convention with China, the Note says that the Chinese Government had repeatedly given assurance that the Treaties concluded by the former Tsing Dynasty should continue to be valid; that the Tibet Convention of 1906 and the Tibetan-Indian Trading Regulations of 1908, being of the nature of international agreements, remain in force as much as ever and ought to continue to be observed by the contracting parties; and that inasmuch as those documents already defined the status of Tibet with sufficient clearness, there was no need of negotiating a new Treaty on the question.

With reference to the closing by England of communications between Tibetan and Indian frontiers, the Note stated that such action was not usually resorted to except by nations at war with each other. It expressed regret that the British Government should have seen fit to apply such a measure to China, a state on very friendly terms with it; but it entertained the hope that this decision would be recalled without delay.

Finally the Note implicitly demurred to the proposal of the British Government to recognize the Chinese Republic on condition that the Tibetan question was settled to its satisfaction first; for it ignored this condition and merely observed that recognition of the Republic by England would be of as much benefit to her as to China. It therefore persuaded the British Government to take the initiative in extending recognition to the Republic of China without entangling it with the Tibetan question.

TRANSLATION OF LETTER FROM THE WAI CHIAO PU TO SIR JOHN JORDAN?

(FORWARDED January 10, 1913.)

YOUR EXCELLENCY,

On the 23rd December, 1912, in regard to the Tibetan question, a memorandum was sent to your Excellency for transmission to His British Majesty's Government.

The Chinese Government is very desirous that, regarding the Tibetan question, the British and Chinese Government should come to harmonious arrangement and avoid all misunderstanding.

It is hoped that Your Excellency will communicate to us at as early a date as possible what your Government has to say with regard to our reply, so that the Chinese Government shall be able to re-consider the question and a satisfactory solution may be reached.

We have the honour to make this necessary communication to Your Excellency and await your reply.

THE HUKUANG LINES

LOAN DIFFICULTY ARRANGED

The negotiations which were opened some time ago between the Minister of Communications and the Banks interested in the Hukuang Loan have reached a conclusion, and therefore money will soon be available for the commencement of work on the lines. The suspense connected with the negotiations for the big reorganisation loan had some effect in preventing the Hukuang question from being settled. Diffidence to advance the money was caused by the Revolution making the security doubtful and in pursuance of their desire for a revision of that aspect the Bankers touched on other points which the Minister for Communications could not see his way clear to concede. The money now, however, will be advanced, the Chinese agreeing to the appointment of auditors as employees of the Government. The line will be collateral security until the original security is deemed satisfactory. The money will be deposited in the foreign Banks until an arrangement is made with the designated Banks.

There were many rumors afloat with regard to the desire of the recently appointed Managing Director, General Hwang Hsing to retire, and his resignation has now been officially accepted. It is said that he felt that he should not be under the direction of the Board of Posts and Communications. Another report has it that he has effected a rapprochement with General Li Yuan-hung, and that the two are spoken of as the possible President and vice-President of the Republic. This may be taken for what it is worth. It is a pity, if it is true, that a little more time is not devoted to the practical things of the country, rather than to a constant flight after the bubble reputation.

SURVEY OF THE HUPEH-HUNAN TRUNK LINE

The survey of the northern section of the trunk line from Canton to Hankow, that in Hupeh and Hunan, is continuing as rapidly as is possible, according to latest reports. We are informed that the survey from Wuchang to Yochow, on the north-eastern extremity of the Tung-ting Lake, has been completed, the distance being some 160 miles, whilst parties are now pushing through between that point and Changsha, and between Lukow and Heng Chow-fu. Three parties are running preliminary surveys between Heng Chow-fu and Yichang-hsien, on the border of Kwangtung and Hunan, with the object of finding the easiest road through this difficult piece of country. Altogether ten survey parties are operating between Yochow and Yichang.

This line promises to be one of the most picturesque as a travelling route in China proper. The country is reported to be extremely picturesque, well wooded, and in addition is rich in minerals. There are magnificent gorges to be penetrated, especially in the Nanling Mountains, on the border, and in crossing this range the line will reach an altitude of from 1,200 to 1,300 feet, the highest on the route. There will be some very long bridges, and, unless a better route can be found than that originally surveyed on the Sinling Mountains, one of the longest tunnels in the world will have to be pierced. This, it is hoped, will be averted, and for that reason special attention is now being given to the surveys in the locality by three different parties.

Taking it all in all the line will be a heavy one to build, and presents numerous difficulties from an engineering point of view. For the first ten miles from Wuchang the country is flat. It then runs into the hills, gradually crosses the tea districts of Yang Lou-su and Yang Lou-tung, and goes on to Yochow. From Yochow the line will run as direct as possible to Changsha, and then to Chuchow at the junction of the Liang Shui River and the Siang River, which latter will be paralleled to an extent for a considerable distance.

From Changsha to Chuchow the line has already been constructed by a Chinese provincial company, the distance being about 35 miles. This will be merged in the main line. Chuchow is also the junction with the Pingsiang Colliery line. From there the main line will run south, past the sacred mountain of Hengshan, to Heng Chow-fu, from which city the valley of the Lei river will probably be followed, passing through the Nanling Mountains and connecting with the line in course of construction from Canton.

THE CHANGSHA-CHUCHOW LINE

The local company controlling the section of the line already constructed and operating between Changsha and Chuchow is holding out for an exorbitant price for the line, especially when its present condition is taken into consideration. The embankments in numerous places are in bad condition, and where the line parallels the river Siang erosion is constantly going on, with no attempt on the part of the operating company to take preventive measures or even repair the damage done. In the past, of course, concrete of a poor quality was used in places, but work in this direction ceased over a year ago.

The permanent way is likewise badly neglected, the sleepers rotting and ballasting being compelled to take care of itself. The price being asked is Tls 8,000,000 for 105 *li* of line, or about 35 miles.

At Changsha this line starts from the north gate station, skirts round the east wall, and reaches the river south of the city. It then parallels the bank for some distance, and is open to the effects of the water even at mean height. When the main line is under construction the route will, at this point, no doubt, be further removed from the river, or be built under different methods. The ballasting is of gravel, and the gauge standard.

On the line there are four or five bridges, none above 200 feet long, the ironwork, it is reported, being imported and erected by the Yangtsze Engineering Works of Hankow. There are five stations on the line, some of the buildings being substantial brick structures, whilst others are mere huts. Telephone and telegraphic connection exists between the stations, though one wire serves for both purposes.

The programme originally entertained for the erection of work shops and a round house were suspended some time ago owing to the progress made with arrangements for the commencement of work on the main line, but the walls of the round house are up, the location being at the Hsin-ho station at Changsha, where there is a turn-table built by the American Bridge Company. In the absence of shops of their own the Company has most of their repair work done at the shops of the Pinghsiang Colliery road.

The following is a list of the rolling stock of the road: Two Baldwin Mogul engines (eight wheels of which six are driving) with separate tenders; two Baldwin double enders (ten wheels, of which six are driving); two first class passenger cars and eight second class and third class passenger cars of German construction, and ten freight cars (box, gondola and flat cars) of British manufacture. The cars are fitted with automatic couplers, but are without air brakes, though the engines are fitted with them. Four other Baldwin locomotives and thirty cars were ordered from America for delivery last autumn, and an order was also on foot for Taels 43,000 worth of machinery for the proposed shops, but in view of the negotiations for the purchase of the road this latter order, at least, has, we understand, been held over.

Like most other Chinese privately owned lines this one suffered sadly from financial anemia, the earning capacity being no more than about $200 Mexican per day of which all but $20 was for passenger fares. The line merely connects two river ports and traverses a sparsely populated country, with water competition for freight, and possessed no great earning power, and is not likely to possess any, until extended or connected up with the main line, or until connection with the Yangtsze is effected from Yochow.

It is stated that Taels 6,000,000 have been spent ostensibly on the railway, and running short of funds the company issued its own notes to facilitate their operations. Gladly enough shareholders welcome the chance to see a return of their capital from the Government purchase of the line, but the price at present being asked is so stupendous for what would be obtained that the Government are hesitating before closing any deal, though in the ultimate it will be essential for them to obtain and control the road. As in Szechuan this fact is realised and consequently the native Company is likely to hold out for the highest price that it can get.

THE SZECHUAN-HANKOW OR CHUAN-HAN LINE

But few railways have the distinction of having caused a revolution, but this is accorded by some to the projected line from Hankow to Chentu, via Ichang, Kweichowfu, Wanhsien and Chungking. Those who are fully informed know that the agitation that arose in Szechuan in consequence of the railway nationalization policy adopted at the instance of H.E. Sheng Kung-pao, simply provided the revolutionary organization with their opportunity, which was successfully seized. To say, however, that the revolution was caused by Sheng's policy or the conclusion of the Hukuang Loan Agreement, is to misread history. It is true, though, that the Chinese for over ten years have been bent upon building the Szechuan Railway themselves, and the desire to avoid recourse to foreign assistance led to the subscription of large sums of money, much of which, however, has been expended in directions from which no return can possibly come.

By Article II of the Hukuang Agreement the Loan was to provide capital, *inter alia*, for:—A Government railway main line from



SZECHUAN RAILWAY—STATION AT ICHANG

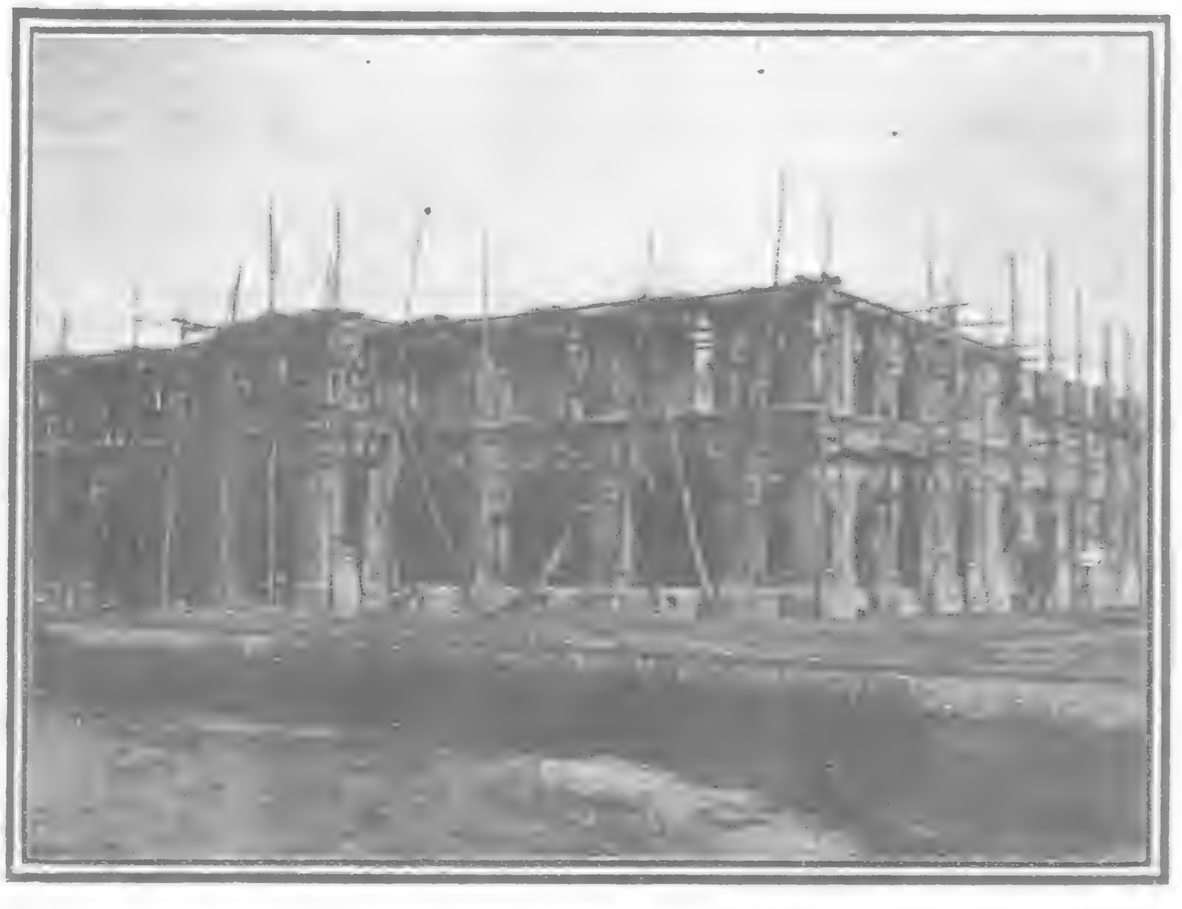


THE YANGTSZE AT ICHANG

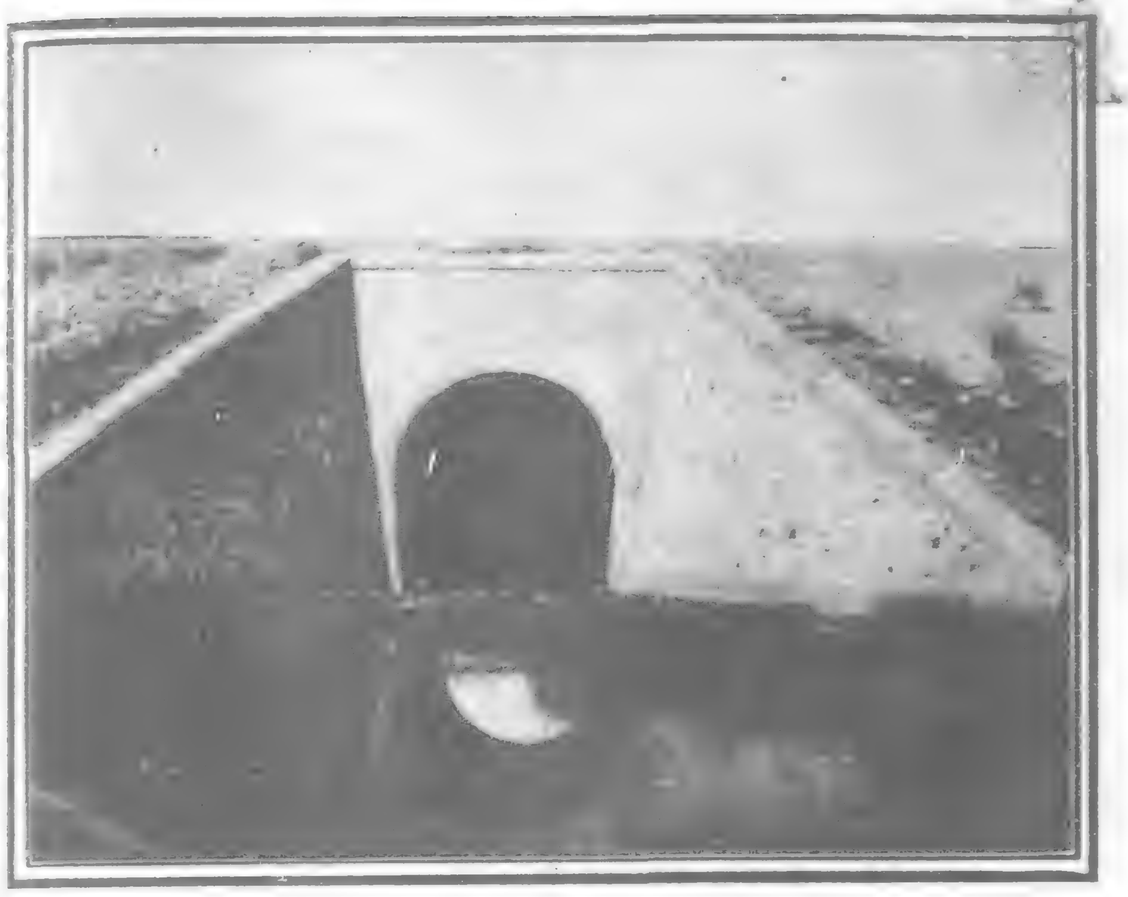
a point at or near Kuangshui in the Province of Hupeh, connecting with the Peking-Hankow Railway line and passing through Hsiangyang, and Chingmenchow to Ichang, an estimated distance of 1,200 Chinese *li*, or 600 kilometres, and from Ichang to Kweichoufu in the Province of Szechuan, an estimated distance of 600 Chinese *li*, or 300 kilometres.—this latter section of the main line having been added in substitution for the branch line from Chingmenchow to Hanyang originally agreed upon, the total length of this main line, hereinafter known as "The Hupeh Section of the Szechuan-Hankow Railway line" being about 1,800 Chinese *li*, or 900 kilometres.

The agreement was signed in May, 1911. By Article III it became incumbent upon the Government to take over the lines already constructed in Hupeh and Hunan. This was resented by the Chinese shareholders, who showed their dissatisfaction in the usual way. It may be remarked in passing that the agitation against nationalization and foreign aid was the more extraordinary in view of the lamentable failure of the company to show results. At a meeting of shareholders held in November, 1909 the accounts submitted showed that a sum of Tls. 15,405,902 (say, £2,006,000) had been collected in shares, taxation, investments of capital, etc. Of this only 28 per cent. had been subscribed voluntarily, the greater proportion of the remainder having been collected as "tsu ku"—i.e., shares given in exchange for forced levy, payable by every landholder in the form of an addition to his land-tax. Though at the time of the meeting the first sod had not been turned and the company had been in existence some five years, the actual balance in hand was only Tls. 10,421,958 (say, £1,357,026). Among other grounds for dissatisfaction it was found that there were on the books 240 employees drawing some £8,500 a year in salaries and wages; the explanation afforded was most inadequate, and as a result certain of the directors and assistant-directors were handed over to the authorities to be dealt with on charges of malversation of the funds.

The company had been organized by H.E. Hsi Liang, then Viceroy of Szechuan, in 1904 in order to prevent a foreign loan being raised for the construction of the line. Shortly afterwards the services of two American students, Messrs. Hu and Luk, were secured to survey the line, but nothing came of the survey. The policy of the company was to defer work until sufficient funds were in hand to complete the section from Ichang to Kweichow,



SZECHUAN RAILWAY—HEAD OFFICE AT ICHANG; UNDER CONSTRUCTION



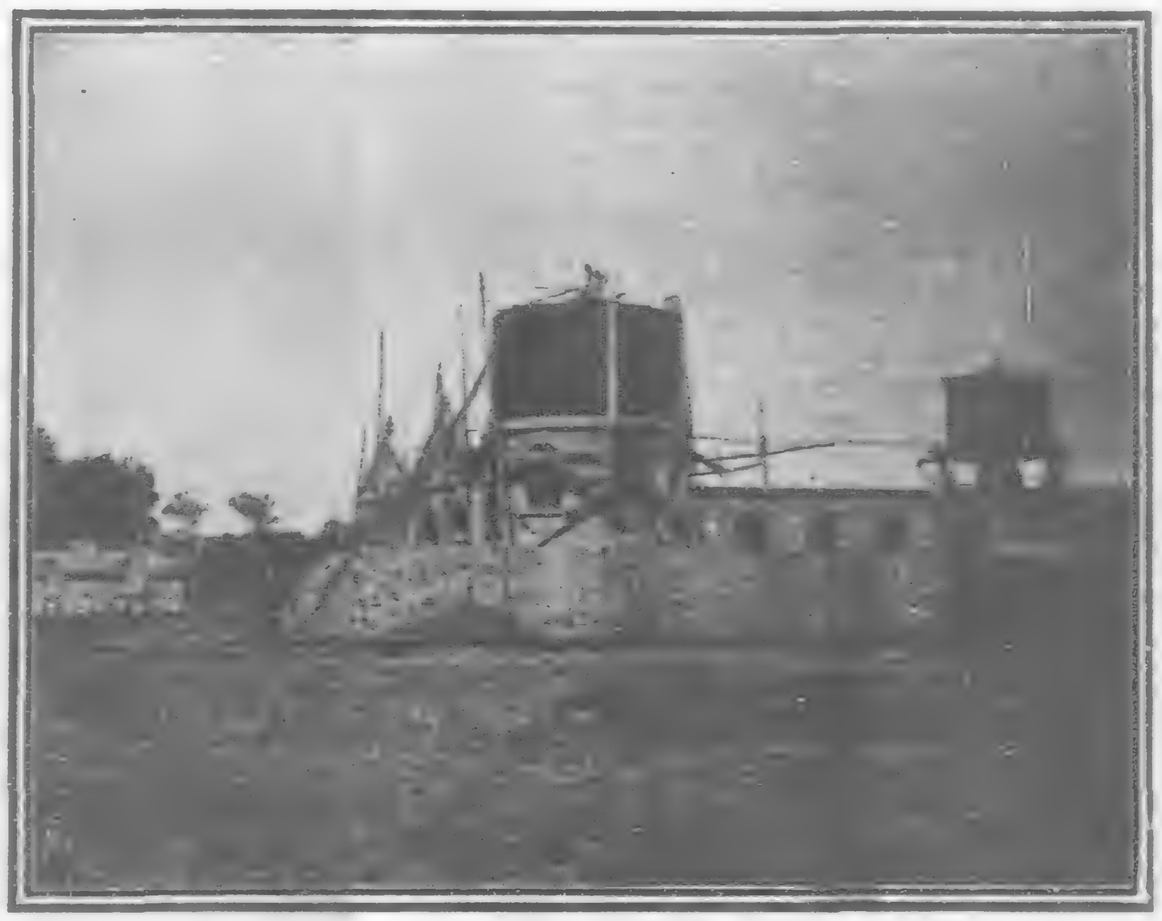
SZECHUAN RAILWAY—AN ARCH BRIDGE



SZECHUAN RAILWAY—TWO 100 FEET SPAN BRIDGE AT ICHANG



SZECHUAN RAILWAY—STOREROOMS AT ICHANG



SZECHUAN RAILWAY—WATERTANK WITH ENGINE SHED IN REAR AT ICHANG



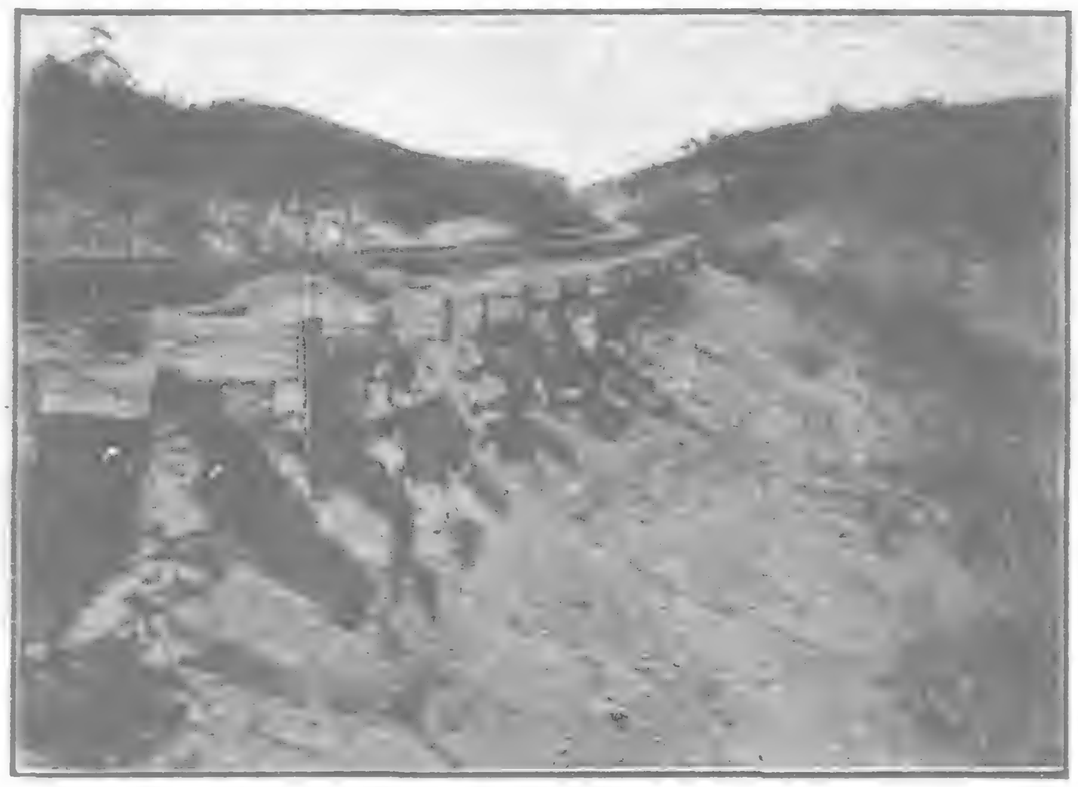
SZECHUAN RAILWAY—VIEW ALONG THE LINE



SZECHUAN RAILWAY—TUNNEL NO. 1; 800 FEET IN LENGTH



SZECHUAN RAILWAY—VIEW SHOWING THE GENERAL IRREGULARITY OF THE LINE, A NOTICEABLE FEATURE THROUGHOUT



SZECHUAN RAILWAY—SHOWING HOW THE EMBANKMENTS HAVE GIVEN AWAY, AND THE CHARACTER OF THE SLEEPERS

a distance of about 100 miles. A great squabble arose about this time in regard to the question whether the Ichang-Wahnsien section or that between Chungking and Chengtu should be built first. An engineer named Mr. Li, an official of the Yuchuanfu, was borrowed, and he decided that it was best to start from Ichang towards Wahnsien.

Mr. Li Chih-shuen was appointed President of the line and Mr. Jeme Tien-yu, who constructed the Peking-Kalgan Railway, Engineer-in-Chief. As the latter could not be on the spot all the time Dr. Yen Te-ching was appointed Resident Assistant Chief Engineer. Two surveys were made, one inland and one along the Yangtsze and were compared with the object of selecting the most feasible route.

The first sod was turned by Mr. Li, the President of the Company on December 10, 1909 at Ichang, the occasion being made one of great rejoicing. Actual construction did not start until later, the first spike being driven at Ichang on July 21, 1910. The work was pushed ahead with rapidly during 1910. Early in the year 10,000 coolies were employed and by November 15,000 were at work. Up to the time the revolution broke out about 16 miles of railroad to Hsianchi had been laid, although preliminary work had been begun for 60 miles. At present the portion constructed is rapidly deteriorating as will been seen from one of the illustrations accompanying this article.

The administration offices and head station are outside the east gate of Ichang. From there the line goes north-west inland. This is necessitated by the mountainous character of the country. Some idea of the magnitude of



SZECHUAN RAILWAY. END OF PRESENT CONSTRUCTION, SHOWING SUBSIDED EMBANKMENT AND FLOODED CUTTING BEYOND

the undertaking can be gained when it is mentioned that there is fifteen miles of tunnelling through solid rock between Ichang and Wanhsien. Beyond the town of Hsiangchi there is a succession of precipitous mountains and lofty passes. The lowest is 800 ft. high and the highest 4,000 ft. Thence along the Yangtsze until the neighborhood of Wanhsien is reached, the mountains stretch down to the river like the teeth of a comb. Calculations of the time to be occupied in getting the track completed between Ichang and Wanhsien, vary from ten to fifteen years, and the estimated cost is Tls. 38,500 per Chinese *li* (about one-third of a mile.)

Two tunnels have been completed, one 800 feet long and the other 200 feet, while eight others were fairly under way when work was stopped. These include two, twenty-five miles from Ichang, each of about 1,000 feet. The longest tunnel is 6,200 feet long and is about fifty miles from Ichang.

Work was started on this tunnel in November 1910 with five shafts and a distance of 1,500 feet had been driven when the famous Imperial Edict which caused the cessation of the work, was issued.

The ruling grade of the line is one in 40, which is very good for such country. The rails are of 85-lb. weight, 13 sleepers to the rail.

The actual work accomplished and begun on the Ichang-Kweichoufu section may be summarized as follows:—

Bunding wharf finished.
Three goods godowns erected.
Earth works at wharf and station finished.
Double track laid from wharf to station.



SZECHUAN RAILWAY—SEVEN SPAN BRIDGE NEAR ICHANG



SZECHUAN RAILWAY—LOCOMOTIVE SHEDS



SZECHUAN RAILWAY COMPANY LOCOMOTIVE AND CARS

Ichang station finished.
Four stations along line finished.
Two engine sheds for 12 locomotives finished.
Water tower finished.
Machine shops finished.
Head Administration office finished.
Store Department and staff quarters finished.
Courses of creeks changed.
Numerous stone retaining walls finished.
Over fifty bridges finished.
Over sixty bridges started.

It may be mentioned that the machine shope are electrically driven and are fitted with American machinery. About 100 bridges were bought from the American Bridge Company. A good many



SZECHUAN RAILWAY—TEMPORARY WORKSHOP AT ICHANG

orders for this line, however, went to British manufacturers.

ROLLING STOCK.

3 Baldwin shunting engines.
1 first class private car.
2 2nd class passenger cars.
4 3rd class passenger cars.
50 high side freight cars.
30 steel ballast cars (German)
20 flat cars (German).

The passenger cars were bought from the Government Railways of North China.

It was reported in November that it had been arranged that the Central Government should build the railway and that they should repay Tls. 10,000,000 to the Szechuan people, Tls. 200,000 to be paid when the work of construction is restarted early this year.

THE SALT GABELLE

REGULATIONS REGARDING AUDIT

The Government has issued regulations governing the reorganization of the Salt Gabelle. It would appear that these regulations were issued without any reference to the bankers, and that they are not deemed satisfactory by the Diplomatic Corps. Admiral Tsai Ting-kan has been appointed Inspector-General of the Gabelle and Mr. J. F. Oiesen has accepted the post of vice-Director.

The new regulations are as follow:—

I.—GENERAL.

1.—The present regulations govern the receipts and payments for the Salt Gabelle of China, the amount of salt consumed, the salt offices outside Peking, and their branches.

2.—On account of the importance of salt affairs and the complicated nature of salt accounts, the Ministry of Finance has established a Department of Audit and Report of the Salt Gabelle, in the Ministry, and its branches in the provinces, in order that the Salt accounts may be properly audited. Foreigners will also be engaged to assist the department.

II.—NUMBER OF OFFICIALS.

3.—There shall be a Director appointed by the Minister of Finance, a vice-Director, who should be a foreigner employed by the Minister, and a number of auditors, who shall not exceed ten in number.

4.—In the provinces, the branch department shall have one Chinese Director and one foreign vice-Director, and the rest of the employes shall, according to the circumstances, be fixed by the department with the approval of the Bureau of the Salt Gabelle, and the Minister of Finance.

III.—THE AUTHORITY.

5.—The said Department shall be under the control of the Bureau of the Salt Gabelle, and the branches in the provinces under the said department, and the Chief of the Bureau of the Salt Gabelle shall have authority over them all.

6.—The affairs of the said department shall be audited by the Bureau of the Salt Gabelle, and the branches in the provinces by the said department. But all shall be done under the supervision of the Ministry of Finance.

7.—The production, transportation and other administrative affairs in connection with the Salt Gabelle are not under the control of the said department and its branches in the provinces. But the salt certificates, which are in connection with the receipts, shall not be considered valid unless signed or sealed by the officers of the said department or its branches.

IV.—THE DUTIES.

8.—With regard to the receipts of the salt revenue, the branch offices are responsible for their safe-keeping, and they shall be from time to time remitted to the Government treasury, with a report to the Salt Commissioner and the said department for auditing purposes. With regard to payments they shall be submitted by the Chief of the Salt Gabelle to the said department, which after signing the documents will re-submit them to the Minister of Finance for investigation.

9.—At the beginning of a new year the branches in the provinces shall draw up an estimate with detailed explanations and send it through the Salt Commissioner to the Ministry of Finance for investigation, and accounts shall also be reported in the same manner.

10.—Besides the above estimates and accounts, a similar method of rendering accounts shall be copied from the Customs Service, i.e., every three months, returns shall be rendered to the Salt Commissioner at the nearest place and to the said department, for investigation.

11.—The forms used in recording the estimates, accounts, etc., for the branches shall be fixed by the said department, submitted to the Chief of the Salt Gabelle and the Minister of Finance, for approval, and then be sent to the branches for printing, etc.

12.—The estimates, accounts, etc., received from the provinces shall be summarised by the said department who will then submit the same to the Minister of Finance for investigation.

13.—If the said department or its provincial branches should desire to make any investigation in the accounts, the Chief of the Salt Gabelle or the Chief of the Salt Department may be consulted, whether the books be investigated or a delegate be sent.

V.—OBSERVATION

14.—These Regulations shall take effect from the date of promulgation.

THE BELGIAN RAILWAY LOAN

FULL TEXT OF THE AGREEMENT

A loan agreement was recently signed for the extension of the Kaifong-Honan line, but so far no certainty exists that the work will be carried on as at first contemplated. This line, with its extension to Lanchow, the capital of Kansu and the eventual march westwards to the Russian frontiers is the most important line in China, and it is inconceivable that its control by a practically unknown group of financiers will be permitted without a protest from the nations who have large interests in the country. Already murmurings are in the air, and it is not unlikely that desires to have a revision of the agreement will shortly take definite shape. The money market of the world is so sensitive to the touch of certain hands, that difficulty may be experienced in floating the loan, and the probability is that, unless the syndicate now in control is able to defy the covetous, a rearrangement will be come to. So far the Chinese Government has appointed a Director General, and it is understood that he is making preparations to commence the survey. There is also a difficulty in that direction, for opposition to his appointment is already being raised, though not upon sound grounds. The opponents have a nominee of their own, and for that reason they feel justified in advocating the removal of Mr. S. C. Sze, who now holds the post.

The following is a translation of the agreement:—

Preamble

The "Compagnie Générale de Chemins de Fer et de Tramways en Chine," concluded with the Chinese Government in the 29th Year of the Emperor Kouang-su, corresponding to the year 1003 of the occidental calendar, a loan contract for the construction of a railway from Kaifong to Honan-fu in the Province of Honan.

Article 23 of the contract stipulated:

"If the Company of the Railways and Tramways in China finishes, in good condition, the work of the railway from Kaifong-fu to Honan-fu, strictly in accordance with all the clauses of the present contract, in this case and if the Chinese Government decides to extend the railway from Honan-fu to Sian-fu, the Director General of the Imperial Chinese Railways obligates himself to agree to a preference and to give an option for the loan required for the enterprise to the Company, conformably to the clauses and conditions of the present contract.

It is well understood that if the Chinese Government is able to provide the necessary capital for the construction of the extension from its own resources or with funds raised by the subscription of its own nationals, the Company may not benefit by this Article."

The Chinese Government, having decided without further delay upon the construction of a principal transversal line of which the Pienlo and Lotung railways form the central sections, recognizing that the Company has completed in good condition the construction of the railway from Kaifong-fu to Honan-fu, taking into consideration that certain clauses of the aforementioned contract of 1903 offer serious difficulties, notably the clause admitting the foreign companies to a participation in the benefits,

Desiring to unify in the best possible way the construction, the equipment and the operation of the proposed great transversal line, namely by the incorporation of the aforementioned contract of 1903 into a new contract:—

Has concluded with the General Company the present contract which has for its object the connection by rail of the city of Lanchow-fu with the sea, passing through Sian Fu, Tun Kwan, Honan-fu, Kaifong-fu, Koreite-fu, Suchow-fu, and the Government receives to itself all the rights and advantages arising from the development of this line in its entirety, although at the same time it grants to the General Company certain compensation for the abandonment of its rights previously required.

Articles I.—Contracting Parties.

This contract was made at Peking, September 24, 1912. (First Year of the Chinese Republic).

The contracting parties are:—

Monsieur the Minister of Communications, duly authorized, by the Presidential Order dated August 21, to negotiate in the name of the Government of the Chinese Republic of the first part, and "La Compagnie Générale de Chemins de Fer et le Tramways en Chine," domiciled at Brussels, represented by Mr. Robert de Vos, duly authorized, hereafter called "The Company," of the second part.

Article II.—The Amount of the Loan

The Chinese Government authorizes the Company to issue a five per cent gold loan of two hundred and fifty million francs.

Article III.—Date and Name of the Loan

The loan will bear the date of the issue of the bonds: it will be called "Emprunt du Governement de la Republique Chinois" (Loan of the Government of the Chinese Republic) five per cent. gold, of 191.. (1912 or 1913, first or second year of the Chinese Republic) for the Railway of Lung-Tsing-U-Hai.

Article IV.—Object of the Loan

This loan is made exclusively to provide the necessary funds for the following purposes:—

1. The construction and equipment of a principal line which will connect Lanchow-fu, the capital of Kansuh, in the West, to a seaport to the North of the Yangtsze River, in the East, making use of the Pienlo and Lotung sections, and eventually the Tsing-Kiang-Pu railway branch, and passing through Sian-fu, the capital of Shensi, Tun Kwan, Honan-fu, Kaifong-fu, the capital of Honan, Kweite-fu and Suchow-fu, province of Kiangsu. The definite survey and the eastern terminus will be decided jointly by the Director General representing the Chinese Government and by the Company, who will be guided in their selection by the interests of the enterprise. It is understood that the construction of the equipment includes the purchase of the necessary property and of material, rolling stock and other, as well as the work of joining together the existing sections in such a way as to insure an early and fruitful operation of the whole line.

2. *Pienlo Section*

The redemption of the 41 million franc loan on the Kaifong-fu-Honan-fu (Pienlo) railway of November 12, 1903.

As soon as the redemption has been made the Kaifong-fu-Honan-fu (Pienlo) contracts will be cancelled and the Pienlo line, forming a section of the principal Lung-Tsing-U-Hai line, will be operated and managed in accordance with the clauses of the present contract.

The interests of the bondholders refusing to redeem their bonds and interest at 5% will be protected by a deposit in a foreign bank named by the Company of a sufficient amount deducted from the amount of the present loan in order to insure the payment of the coupons to July 1, 1915, and the redemption of the principal on that date.

In compensation to the Company for the abandonment of certain rights which it possesses by nature of the contract of 1903 as far as administration and control are concerned, especially the 5% of the profits of the operation of the Pienlo Railway, the Chinese Government agrees to include in the present contract the extension of the Pienlo Railway East to a seaport. The Company renounces the 20% of the profits of the Tungsi Section to which it was entitled by virtue of Article 23 of the contract of 1903: it gives up also the special rights of administration and control accorded it by the contract.

In exchange for this renunciation the Chinese Government includes in this contract the construction of the extension of the Tungsi line West to Lanchow-fu, province of Kansuh.

Lotung Section

The Chinese Government obligates itself to purchase, equip and put into operation the Lotung section, granted to the provincial company of Honan, so that the Company may at an opportune time take all necessary steps in order to prosecute without delay and hindrances the work outlined in this contract to the West.

The Tsing-Kiang-Pu Branch Line

This branch of about 20 kilometres to the old bed of the Yellow River belongs to the Chinese Government which agrees that if the line from Suchow-fu to the terminus is so run so that this branch will be included it may be used by the contractors subject to the approval of the Engineer-in-Chief.

The cost of this undertaking will be taken from the amount of the loan.

3. To the management of the terminus port.

4. To the payment of the intercalary interests due on the loan as well as the operation expenses during the period of construction, the time of which is estimated at 5 years reckoned from the beginning of the date of the completion of the preliminary studies.

ARTICLE V.—INTEREST

The interest on the loan will be at the rate of 5% per annum upon the par value and it will be paid semi-annually by the Government of China to the bondholders: it will be calculated from the date on which the loan will be placed on the market and paid under the conditions hereinafter stated.

ARTICLE VI.—THE LIFE OF THE LOAN AND REPAYMENT

The life of the loan will be forty years. The repayment of the capital will commence ten years after the issue of the loan to the public.

Under the reserve of the right of repayment before maturity as provided for hereinafter the repayment will be paid in annual amounts in accordance with the tables of amortization annexed to the present contract.

The amounts necessary for the annual amortization will be paid to the Company in equal semi-annual payments, under conditions hereinafter stated.

After ten years from the date of the loan the Chinese Government will have the right to redeem in whole or in part the amount of the loan not yet redeemed by paying a premium of 2½% upon the par value of the bonds, in case of redemption before the 17th year of those bonds which by virtue of the table annexed to this contract the redemption would not be obligatory. Each time the Chinese Government wishes to make an extraordinary redemption, it must give six months previous notice in writing to the Company.

The extraordinary redemptions will be made by supplementary drawings (lottery) which will take place at the same time as the ordinary drawings, in accordance with the provision of the prospectus of the loan.

The redeemed bonds and interest coupons will be received and cancelled by the Company when they shall have been presented for payment: the Company will transmit them in good order to the Minister of China accredited to the countries where the payment has been made.

The Company will pay to the Chinese Government the total amount of every bond or interest coupon which shall not have been presented for payment in thirty years from the date on which they were redeemable or payable.

When the loan shall have been wholly redeemed the present contract becomes immediately null and void.

ARTICLE VII.—SERVICE OF THE LOAN

The Chinese Government undertakes for the present, the formal engagement and without reserve of paying fully and exactly the interest and to repay the capital of the loan conformably with the table annexed to the present contract. During the construction the interest will be paid from the funds realized from the proceeds of the loan.

The Chinese Government will raise the funds necessary for the service of the interest after the completion of construction and for the repayments from the receipts of the railroad: in case of insufficiency from the general revenues and at their default from the surplus not utilized in accordance with Article XIII.

The receipts of the railway shall be deposited promptly in a bank designated by common consent of the Chinese Government and the Company. This bank will deduct from these deposits for conversion into gold in the best interests of the Chinese Government the total amount necessary for the service of the loan for the two following semi-annual payments. This conversion will be made in such a way as to insure a supply of gold necessary for the service at least fourteen days before the day of maturity.

The half yearly payments due for interest and reimbursements will be deposited by the Company fourteen days before the day of maturity fixed by virtue of the preceding paragraph.

These deposits will be made by the Minister of Communications in the Banks designated by the Company in "sycee" used in the port where the payment takes place or in National Money (when it will be in circulation) and should be of a sufficient sum total to convert these payments into gold in Europe.

Exchange

The exchange for these payments will be fixed with the Company and the Banks designated by it the same day the deposit in silver is made.

Nevertheless, the Chinese Government will have the power to fix the exchange rate for the whole amount within the six months preceding the date on which the payment should be effected.

If in the future, a Bank of the State of China establishes a branch in Europe and not simply a correspondent or foreign agent, this Bank of the State will share to the amount of 50% of the service of the transfer of the funds with the banks designated by the Company.

Expenses-Charges

To cover the expenses occasioned by the payment of the interest and reimbursement of the principal of the loan the Company will receive from the Chinese Government a commission of a quarter per cent. on the payments.

Guarantees

The payment of the interest and repayment of the capital of the present loan are guaranteed by the Chinese Government and by a special guarantee on the Lung-Tsing-U-Hai Railroad.

This special guarantee constitutes a first lien on the Road itself, the permanent way, the rolling stock, the out houses and the products. It is accepted by the Company in the name of the bondholders.

If the Chinese Government is in default for the payment on the date fixed for all or a part of the semi-annual interest and repayment the Company will have full powers to exercise all the rights of action which accrue to it from the special guarantee.

ARTICLE VIII.—PRICE OF THE LOAN

The price paid by the Company to the Chinese Government for the bonds will be the price of issue to the public on the Brussels Exchange less six per cent. of their nominal value.

The Company will defray the expenses incident to the issue and sale of this loan, such as "syndicat de garentie," commission and brokerage, cost of telegrams, and of correspondence, printing and engraving of the prospectus and of the bonds, stamp duty and taxes. The Director General or the Ministers of China in the country where the issue will have taken place, will be advised beforehand of the price of the issue of the loan.

ARTICLE IX.—ISSUE

The Company is authorized to issue immediately Gold Bonds representing the total amount of the loan. Until issue the bonds will be deposited in banks designated by common agreement.

The Company is authorized to withdraw the bonds from the bank depositories with a view to the delivery to the subscribers in due time, conformably to the prospectus of the loan.

The nominal amount of the bonds will be fixed by the Company, which may make the bonds of different values.

The Company will fix the form of the bonds, the language in which they will be drawn up and the money in which their value will be expressed, conformably to the usage of the country in which the issues will be made. They will notify in advance the Director General or the Minister of China in the countries where issued.

The bonds will bear the fac-simile signature and the official seal of the Director General in order to dispense with the original signature.

Before the issue of the bonds, the Ministers of China accredited to the countries where the issues are made will affix to each document their official seal and the fac-simile of their signatures as a proof that the issue and the sale of these bonds are authorized by the Chinese Government and made in its name and for its account.

These bonds will be countersigned by the agent of the Company in the country where the issue takes place.

All the details necessary for the prospectus, or relating to the interest and to the redemption of the capital of the loan which may not be explicitly fixed by the present loan will be regulated by the Company after having consulted the Ministers of China accredited in the countries where the issue will be made.

The Company is authorized to publish the prospectus of the loan as soon as possible after the signing of the present contract.

The Chinese Government will give instructions to its representatives accredited to the conntries where the issue will be made, for them to sign the Prospectus of the loan and for them to give their assistance to the Company in all questions which may arise.

This loan of two hundred and fifty million francs will be issued to the public in one or in several issues, as soon as possible after the signature of the present contract. The first series of one hundred million francs or less will be issued to the public within twelve months from the date of the signing of the present contract. The rate of issue of the subsequent series which will not be less than fifty million francs, will be fixed by common arrangement by the Company and the Chinese Government in such a way that the work on the material foreseen by the present contract will suffer no delay.

The subscription list will be opened by the Company in Europe and in China in accordance with the following conditions: preference will be given to the subscription of the Chinese Government on the condition that this subscription list may be turned over to the Company at least four days before the publication of the prospectus.

The Company will notify the Chinese Government seven days before the publication of the Prospectus.

If before the publication of the Prospectus for the issue of the loan, a political or financial crisis takes place which would effect the market and the price of Chinese securities already floated to the point of making impossible in the judgment of the two contracting parties, the issue of the present loan, the Company will be granted a reasonable delay for the execution of the present contract.

If the loan has not been issued during the delay the length of which will be fixed by common agreement, the present contract will become null

and void. In this case, the advances which may have been made by the Company by virtue of this contract will be repaid immediately by the Chinese Government with current interest but without any other compensation or remuneration whatsoever.

ARTICLE X.—LOST BONDS.

If any of the bonds issued for the present loan are lost or stolen, the Company will so notify the Minister of Communications as well as the Minister of China accredited to the country where these bonds have been issued.

The latter will authorize the Company to publish notice in the papers that payment on these lost or stolen bonds has been stopped, and to take all measures which may be necessary in the premises in accordance with the laws and customs of the country.

If a bond has been destroyed, or if the bond lost, or stolen has not been found within the time fixed by the Company, the Minister of China accredited to this country shall affix his seal to a duplicate bond, of the same nominal value, and shall deliver it to the Company in its capacity as representative of the lost, stolen or destroyed document. The Company will defray all the expenses on behalf of the owner of the instrument.

ARTICLE XI.—EXEMPTION FROM TAXATION.

All the debts, all the coupons, and all the payments made or received in connection with the service of the present loan shall be free from all impositions and taxes on the part of the Chinese Government during the period of the loan.

ARTICLE XII.—THE TRUSTEE COMPANY

The Company shall be able to act as Trustee for the holders of the third part (les porteurs des tiers) of the present loan.

It will have the power to represent them and it will have the power, likewise, to act in their name in all the negotiations which shall become necessary with the Chinese Government or in any discussion concerning the present loan.

ARTICLE XIII.—PAYMENT OF THE PROCEEDS OF THE LOAN, LIABILITY OF THE RAILWAY

The proceeds of the loan shall be paid to the credit of an account known as "The Lung-Tsing-U-Hai Railway," which shall be opened by the Company or by the Banks designated by it, in Europe (Gold Account in Europe).

The proceeds of the loan shall be placed to the credit of this account in successive payments, in conformity with the conditions accorded to the subscribers to the loan.

The Company shall be responsible for these places of deposit. The credit balance of this account shall bear interest payable to the Chinese Government. The rate of interest shall be three per cent. per annum.

After deducting the payments and the reserves that must be made with respect to the proceeds of the loan, in conformity with the present contract, the Company shall hold the credit balance, plus the current interest, at the disposition of the Director General.

A sufficient sum shall be left in Europe for all payments for materials and the salaries of the staff.

The Director General shall have the power to transfer to China, at his will, the loan funds after having come to a previous understanding with the Company on the subject.

Not more than three millions of francs may be thus transferred in any one week without the consent of the Company.

These transfers shall be made through the Company and the banks designated by it and their total amount shall be deposited to the credit of the Lung-Tsing-U-Hai Railway (Gold Account in China) at the liability of the Company.

In conformity with a table of estimates drawn up by the Engineer-in-Chief of the expenses to be met in China during the month of.....or the following months, the Director General shall determine the total amount necessary to be set aside from the gold account for conversion into Chinese silver.

This conversion shall be made by the Director General and through the banks designated by the Company. It may not be for more than the sums required for one month unless the Company or the Banks designated by it consent thereto.

The proceeds of the conversion shall be deposited in current account to the credit of the Lung-Tsing-U-Hai Railway (Silver Account in China) in the banks designated by mutual agreement:—they shall bear interest at the rate fixed by rules in force for this category of current accounts.

All drafts on the banks designated as depositories of the funds of the Lung-Tsing-U-Hai Railway in China shall be signed by the Director General and the Engineer-in-Chief conjointly.

The amount of these drafts shall be handed to an agent designated by the Director General against a receipt given by the agent and at the responsibility of the Director General. This agent shall not yield up these funds except on a requisition signed conjointly by the Director General and the Engineer-in-Chief.

The Director General and the Engineer-in-Chief shall have absolute control over all the expenditures and receipts of the railway.

During the period of the loan the accounts of the railway shall be kept in Chinese and in French according to modern methods.

The Railways Administration shall publish annually, after the closing of its fiscal year (la cloture de son exercise), a report in Chinese and in French, showing the receipts and expenditures connected with the management of the railway and the public shall have access to this report on request.

ARTICLE XIV.—EVENTUAL DEFICITS AND SURPLUSES

If the proceeds of this loan increased by the interest thereon are not sufficient for the finishing and equipment of the railway, the deficiency will be made up in the following manner:

In the first place the funds which the Chinese Government may have at its disposal will be used in such a manner as to permit the continuation without interruption of the work of construction, the funds thus used will be considered as being a part of the capital of the railway, but the dividends to which the capital thus furnished shall be entitled shall in no wise impair the guarantee which insures the payment of the interest and the principal of the capital forming the subject of the present loan.

If, after this, funds are lacking the Company shall issue a new series of the loan, subject to the conditions of the present contract, for the amount necessary to entirely complete the line and put it into definite operation.

This new series shall enjoy the same guarantees and will be placed, in all respects, on the same footing as the former series of the present loan amounting to 250,000,000 francs.

If, after the completion of the railway, there remains to the credit of the account of the Lung-Tsing-U-Hai railway, a surplus of funds not utilized, this surplus shall be placed in a bank in China that shall be designated jointly by the Director General and the Company.

This surplus shall constitute a reserve for the payments for which the Chinese Government shall be liable by reason of the present contract.

ARTICLE XV.—ADVANCES.

If, in order the accelerate the carrying out of the present contract, the Chinese Government and the Company find that funds are necessary in advance of the issuance of the loan the Company undertake to make the necessary advance at the rate of six per cent. interest per annum. In this case the Company will be empowered to withdraw from the bank in which they are deposited Bonds to an amount equal to one and half times the sum advanced.

These advances will constitute first charges, for their principal and interest, on the proceeds of the loan.

ARTICLE XVI.—CONSTRUCTION

The preliminary investigations for the construction of the line will be commenced within the shortest possible time.

The length of the line will be definitely fixed after these preliminary investigations are concluded.

Work on the railway will be commenced within six months after the signing of this contract. It is estimated that this work will continue for the space of five years after the conclusion of the investigations.

The Chinese Government shall name the Director General of the Railway. This officer will have his permanent residence within the immediate neighborhood of the work of construction. He shall have full power to act on behalf and on account of the Chinese Government within the limits of this contract. The Engineer-in-Chief will be subject to his orders. The emoluments of the Director General will be fixed by the Chinese Government acting with the Company and will be a charge upon the railway.

In a general way and without prejudice to the engagements entered into by virtue of Art. IV pars. 9 and 10 the Chinese Government will provide freely and without encumbrance all the land needed for the construction of the railway and its attached works. It will, therefore, take all measures and will assume the making of all payments and the defraying of all charges whatsoever necessary to assure the passage of the line through public property (governmental or provincial) or private property, in the villages and cities as well as in the country. All the sums required for this purpose and those required for the purposes named in Art. IV. pars. 9 and 10 by the Chinese Government will be placed in the hands of the Government and will be deducted from the proceeds of the loan. However the entire amount to be paid to the Chinese Government under this heading shall be fixed by the Director General and the Company.

The work of constructing the railway will be performed under the supreme direction of the Director General.

The Director General and the Company shall act together and conscientiously choose an Engineer-in-Chief who shall be either Belgian or French, experienced and honest.

The Engineer-in-Chief will conclude the making of the studies, plans, tracings and estimates of the line, will direct the execution of the work thereon, and will have charge of the materials, tools, and the property necessary for the regular prosecution of the work. All these operations, must, however, be submitted in the first place to the Director General for his approval.

The Director General will fix the salary of the Engineer after having come to an agreement with the Company.

The Engineer-in-Chief will draw up a table of organization of the European staff necessary for the construction and will submit it to the Director General for his approbation. This force comprising the Chief of Service, the Chief of Section, the Chief of the Accounting Bureau, etc., shall be engaged by the Company which shall place it under the orders of the Engineer-in-Chief.

In all that concerns the Chinese staff, technical or other, the Director General shall have full power of appointment: he will place it under the orders of the Engineer-in-Chief. No Chinese employe or European can engage without the assent of the Director General.

It is well understood that Chinese subjects having made special studies or having acquired sufficient practical knowledge may be recommended by the Director General to the Chief Engineer who will employ them by the same titles as European employees, but it will be necessary to send them previously to the Chief Engineer accompanied by a technical delegate who will examine their capabilities.

The Director General can revoke appointments for a gross fault in the non technical personnel: in that which concerns the technical personnel and all the European personnel the Director General may demand the recall from the Chief Engineer who shall acquiesce in this demand if the indicated motive is sufficiently recognized.

The European personnel should have in a general manner the greatest regard for the Director General and his special representatives. They should respect the local authorities and not interfere in the affairs of the country. They should equally respect the Chinese habits and customs, in order to live with a good understanding with the inhabitants.

The intention of the contracting parties in inserting the preceding stipulations is to safeguard the prestige of the Director General and assure the regular prosecution of the work.

The Director General reserves to himself, also the right, in agreement with the Company, to delegate for the works one or more special representatives carrying full power. The salary of these representatives to be paid by the Railway.

Supplies

The Company will be charged during all the time of construction with the supplying of everything necessary for the construction and equipment of the line, and for the needs of its operation except Chinese supplies which can be procured on conditions of equal price and quality.

The Company will apply for competition in order to obtain the most advantageous conditions notably those relating to quality and price, but preference will be given to Belgian and French supplies.

These orders for contracts for work should be issued by the Chief Engineer and submitted for the approval of the Director General. The accounts of moneys paid for supplies of material and expenses of every nature paid in Europe should be sent every three months with a statement of accounts and supporting vouchers to the Director General for approval.

Exemption from Taxes

All orders made by the Company in China as well as those abroad will be exempt from all right of taxation, import, and likin on the entry or on their passage through Chinese territory. Nevertheless this stipulation does not impair the right of the Chinese Government eventually to impose on these orders such future taxes as shall be paid on orders destined for the construction and equipment of all other railways of the countries whatsoever.

Expenses

The Company will not have to meet any expense relative to the "construction de ses deniers" but it is well understood that the Director General will pay the Bureau at Brussels only that which concerns the expenses necessary for study, orders, receipts of materials and engaging of personnel. These expenses can be fixed by common agreement at a lump sum payable annually to the Company. Consequently the expenses of representation of the administration, indemnities and others will remain in charge of the Company.

Small Branch Lines

The present contract will apply if the Company will consent to the construction of small branches from the Lung-Tsing-U-Hai Line that will be necessary in order to assure traffic and establish useful relations.

ARTICLE XVII.—WORKING DURING CONSTRUCTION

In proportion to the completion of the different sections of the line the Director General and the Chief Engineer will take, by mutual agreement, the necessary measures in view of their operation.

Future Extension.

If, in the future, the Chinese Government considers it desirable to construct extensions of the Lung-Tsing-U-Hai Railway to better serve the interests of the country, notably to prolong the line to Suchow, via Kan-cheou, Province of Kansuh, it engages itself to extend the preference with the Company and give it the option on the relative loans for these enterprises on the same conditions as those which will be offered by other banks or foreign societies without this stipulation weakening the right of the Chinese Government to execute these works of extension by means of funds raised from Chinese sources.

ARTICLE XIX.—FINAL OPERATION

Personnel and Control

The Chinese Government will be in sole charge of the operation and of the direction of the railway.

It will designate for it the Director General who will be assisted by the Engineer-in-Chief.

The Engineer-in-Chief will be under the orders of the Director General. The Director General and the Company will select conscientiously and by common accord the Engineer-in-Chief who will be of Belgian or French nationality, experienced and honest.

For the dismissal of the Engineer-in-Chief a previous understanding must have been reached by the Director General and the Company.

The Chief of General Accounts, who will be of Belgian or French nationality, will fill at the same time (du bon Emploi) the position of Auditor. He will be named by the Director General and confirmed by the Company. He will sign jointly with the representative of the Director General all the checks drawn and responsible documents of all kinds.

Each time that it becomes necessary to appoint technical employees for the railway, or to define their functions or even to remove them, the Director General must consult with the Engineer-in-Chief and act in accord with him. In case of disagreement between the Engineer-in-Chief and the Director General the difference will be submitted to the Minister of Communications who as the last resort will decide the question.

Supplies

From the beginning of the operation of the entire line the Director General will place orders for the supplies according to the best interests of the enterprise, but conditions of price and quality being equal, preference will be given to Belgian and French firms. In the case where it is a question of making one or more foreign firms agents to purchase supplies for the operation of the line, the Company, under equal conditions, will have the preference for one-third.

ARTICLE XX.—RIGHT OF DELEGATION, SUBSTITUTION AND TRANSFER

The Company may designate one or more banks in China or elsewhere to execute in its stead and place all or a part of the financial obligations with which it is charged by virtue of this contract.

The Company, shall have the rights, under reserve, of all the engagements it has undertaken by this contract, of transferring or delegating all or a part of its rights, powers or advantages, to another Company or group or to agents or administrators, with power of substitution in whole or in part.

It is well understood that the Companies or group having been delegated or substituted by application of the preceding paragraph must be of Belgian Nationality and that these transfers of rights will be subject to the approval of the Minister of Communications.

ARTICLE XXI.—ARBITRATION

In case of differences between the Company or its delegates and the Director General on the subject of the execution of the contract, the conflicts or differences will be settled by the decision of two arbitrators, one chosen by the Chinese Government and the other by the Company. In case of disagreement, the two arbitrators will name a third arbitrator whose decision shall be final.

ARTICLE XXII.—EXECUTORY FORMS

The present contract signed and sealed by the Minister of Communications and of Finance, shall be approved and sealed by the President of the Republic and ratified by the National Assembly, after which, and without delay, the Wai Chiao Pu will officially notify the Minister of Belgium at Peking.

This contract is executed in four copies each in French and Chinese. Two copies will be deposited with the Government of the Chinese Republic and two with the Company. In case of doubt or difference concerning the interpretation of the present contract, the French text will prevail.

Peking, the 24th day of September, 1912. (Year 1 of the Chinese Republic.)

L.S. THE MINISTER OF COMMUNICATIONS.

L.S. THE MINISTER OF FINANCE.

L.S. FOR LA COMPAGNIE GENERALE DE CHEMINS DE FER ET DE TRAMWAYS EN CHINE.

THE LOTUNG RAILWAY

HONANFU AND TUNGKUAN

It was early recognised that it was of the greatest importance that the Pienlo Railway should be extended from Honanfu to Tungkuan, and subsequently to Sianfu. Objection was taken to the provision of foreign capital and eventually the Honan-Tungkuan Railway Company took up the work of construction. In 1909 there were reports that the American Group, represented by Mr. Willard Straight, was going to finance the line, but the Chinese decided to find the funds themselves.

The unfortunate result of the work being hampered by financial difficulties, which has, in the past so often attended purely Chinese undertakings, was also the fate of this enterprise.

The capital subscribed was frittered away without any tangible outcome in the shape of a railway. A loan of Tls. 5,000,000 from the Kungyi Bank was mooted and an agreement was actually signed, but the net result of operations so far has been that seventy miles of earthwork has been completed and rails laid for thirty miles.

The length of the railway when completed will be 160 miles. The standard gauge has been adopted. There is a prospect of a very fair carrying trade in local products, and, of course, when the line is extended to Sianfu and ultimately to Lanchowfu, the Lotung Railway will greatly benefit. The Government, designs to buy up this line in order to pledge the whole length of railway named in the Belgian Loan Agreement, as security for the loan.

The Executive Board of the Railway is as follows:—

President, LIU KUE
Vice-President, PENG YUN-PING
Consulting Engineer, JEME TIEN-YU
Chief Engineer, HSU WEN-CHOUNG
District Engineer, CHAO CHING
Assistant Engineers, LIU CHING, SHEN PEI-CHIA
Secretary, HSU YUNG-KWONG.

Sheng Kung-pao, the director general of the Imperial Chinese Railways, and Mr. Armand Rouffart, the representative of the Cie General de Chemins de Fer et de Tramways en Chine. The line was financed by the Belgian Group which has now arranged to finance the construction of the railway uniting Lanchowfu and Haichowfu, the Chinese Government borrowing 25,000,000 francs, or £1,000,000 sterling at 5 per cent.

The new Belgian Loan Agreement contemplates, in the first instance, a railway 1,700 Kilometres in length, uniting Lanchowfu, the capital of Kansu and Haichow, the proposed new port in Kansu. The fact that the Pienlo Railway is under Belgian influence and that the original concession gave the option of prolonging the line from Honanfu to Sianfu rendered it almost inevitable that the Belgian Group would secure the construction of the great East and West line of which the Pienlo Railway, as already stated, forms a link.

The standard gauge, 4 ft. 8½ inches, has been adopted. The track is single and its condition is described as good. The section between Kaifengfu and Chenchowfu, where a junction is made with the Peking-Hankow Railway is fairly level and there were few



LOTUNG RAILWAY—TRESTLE BRIDGE NEAR HONANFU

cuttings. On the other hand considerable embankment was necessary to raise the road-bed above the surrounding country and to protect it from floods. West of Chenchowfu the loess hills are entered and thence to Honanfu there is a succession of cuttings and tunnels. Of the latter there are eleven between Szechui, a large market town not far from the Yellow River, and Heishikwan, some of them being 2,000 feet in length. While on the Kaifengfu-Chenchowfu section there is a danger of the road being entirely washed away in the event of the Yellow River dyke giving way, on the Chenchowfu-Kaifengfu section there is only a possibility of washouts in times of excessive rain.

In the 115 miles of line there are 403 bridges, 168 of metal and the remainder of masonry. The longest bridge is 300 metres. A steel girder bridge about 1,500 feet in length spans the Lo-ho, an important tributary of the Hoang-ho.

The stations along this line are of an unpretentious character, being one-storeyed semi-foreign buildings.

The commercial possibilities of the line are good as it taps the western section of Honan, which is rich and productive, but the line will not reach anything like its full earning power until the completion of the extensions east and west. Honan coal is used on the line, which is obtained from mines along the Taokow-Chinghua Railway.

ROLLING STOCK

Locomotives: 10 compound and 5 small engines of Belgian make.
Passenger cars: 29.
Freight cars: 307.



LOTUNG RAILWAY—RAILWAY YARDS AT HONANFU



LOTUNG RAILWAY—HONANFU STATION

THE PIENLO RAILWAY

KAIFENGFU AND HONANFU

This line connects the important city of Kaifengfu, in Honan, and Honanfu and there links up with the Lotung Railway between Honanfu and Tungkuan. Some particulars in regard to the latter line are given in the preceding article. The Pienlo Railway was opened to traffic in 1908. It is 115 miles in length, but is really only one link in a comprehensive scheme to connect Kansu and the sea-board. The Pienlo is owned by the Chinese Government, but the administration is in the hands of French officials representing the Belgian Group. The contract for the construction of this line was signed in Shanghai, 1904, between H E.

AGRICULTURE IN WESTERN CHOSEN

ACTIVITY OF ORIENTAL DEVELOPMENT COMPANY

A Chinnampo paper reports that the Oriental Development Company has purchased dry fields to the extent of 2,400 *chobu* in Taichon District, North Pyongan Province. Since last year the Company has directed its attention to agriculture in Western provinces and has been making investigations with a view to getting suitable lands. The recently purchased fields, it is stated, are to be converted into paddy farms, and official permission having been obtained, work will shortly be commenced at an estimated cost of 330,000 yen. In addition to these fields, cultivated lands to the total extent of over 1,000 *chobu* have been bought by the Company near Pyongyang. Further purchases are to be made, but the Chinnampo paper we quote adds that these purchases will be effected gradually lest they may causes a speculative rise in the price of lands.

The fields acquired by the above company, says the *Seoul Press*, are intended for leasing to tenants who can become proprietors after the lapse of a stated time on certain conditions and its activity in West Chosen as well as in Southern provinces will not in the least hinder the achievement of the agricultural policy of the Government-General as is apparently feared by some foreign critics. In other words, the company does not make these purchases for cornering or other speculative objects. Far from that, its principal object consists in improving hitherto more or less neglected arable lands in Chosen by the aid of irrigation and other expensive works and then apportioning them out to diligent and qualified farmers at moderate profits. It is to be hoped that the activity of the company will thus help the increase of peasant-proprietors as desired by Count Terauchi in his recent instructions to provincial Governors.

THE SHANSI OR CHENGTAI RAILWAY

CHENGTINGFU TO TAIYUANFU



SHANSI RAILWAY—STATION AT CHEU KIA TCHOUANG

On October 13, 1902 (14th day, 9th moon, 28th year of Kuang Su) the Director General of Railways, acting for the Chinese Government, signed a contract with the Russo-Chinese Bank for the construction of a railway between Cheng-Ting-Fu (a prefecture of Che-Li Province) and T'ai-Yuan-Fu (the capital of the Province of Shansi). Prior to this an agreement had been made between Fang, superintendent of the Lui-lin-Taiyuan Railway Co. (understood to be acting under authority of the Governor of Shansi) and M. Pokotilow, director of the Russo-Chinese Bank, for the construction of this line. The line including "official profits" was estimated to cost Tls. 6,800,000. The agreement provided that the company should borrow that amount from the Bank at 6 per cent. The contract of October, 1902 was signed by H.E. Sheng Hsuan-huai, acting under authority of an Imperial Decree, and Mr. C. R. Wehrung, one of the directors of the Bank. The amount of the loan was forty million francs and the rate of interest five per cent. It was provided that the Bank would endeavor to finish the work within a term of three years. Article V of the contract provided for the interdiction for 30 years, or while the loan was unredeemed, of the construction of another railway between Lui-lin and Taiyuanfu, that would be detrimental to the interests of the line.

The Russo-Chinese Bank transferred this concession to the "Société Française de Construction et d'Exploitation de Chemins de Fer en Chine," and in 1903 engineers were sent to China to build the first section.

The Engineer-in-Chief remained in Shanghai and arranged a preliminary draft contract, in which the gauge was not specified. The negotiations were lengthy because the Chinese Government desired to adopt the standard gauge, but as four-fifths of the line traversed mountainous districts and the remainder was a very tortuous route the French Society could not undertake to build a standard gauge at the proposed price of forty million francs.

The cost of building the line to standard gauge was estimated at 75 to 80 millions, and the earnings for many years would be inadequate to pay the interest on such a large sum.

The construction of a metre gauge line would necessitate a much less sum, and satisfy all the requirements of traffic over a period of 60 to 80 years.

So, finally, at the end of 1903, the Chinese Government accepted the metre gauge, and on July, 1904, the work commenced on the surveyed section up to kilometre 32, and the laying of the track was pushed forward with great activity.

Sketch of the Line

The preliminary reconnaisance was made before 1902, by engineers from a large construction firm of Paris. The starting point was about one hundred metres from the banks of the river Hou-Ta-Ho, at Louo-Liau, a village on the line of the Peking-Hankow Railway.

As the Hou-Ta-Ho often rises and causes great damage by floods, it was decided to start from Cheu-Kia-Tchoung a small village near the station named Kin-Han (abbreviation of Peking-Hankow) situated 15 kilometre to the south of Cheng-Ting-Fu and 277 kilometre from Peking.

The line proceeds westwards up to Cheo-Lang-Hien, kilometre 160, and then inclines towards the south, descending south-west to Tu-Tzeu-Hien (217 kilometre) and from there, north-west to T'ai Yuan-Fu, 243 kilometre.

From Cheu-Kia-Tchouang as far as kilometre 16, the line rises by easy gradients to the plain of Houe-Lou-Hien, arriving at the foot of the T'eou-Ts'iuen mountain (24 kilometre).

From this point it ascends to kilometre 30, with a grade of 18 to 19 millimetres per metre. From there, the line descends with an incline of 12 millimetres per metre for two kilometre so as to ascend and arrive at the first range of mountains, which it traverses through a tunnel of 150 metres to kilometre 34.

From kilometre 40 the grade is from 12 millimetres, crossing the Chin-Ho, (a tributary of Mien-Chouei) over a bridge of two trusses of 50 metres each. Finally, it joins the right bank of the Mien-Chouei and follows the conflux of the Hsi-Han-Ho and Mien Chouei, to where it crosses the branches of the Hsi Han River over two bridges of 50 and 60 metres.

Between these bridges it was necessary to place a metal truss of 10 metres, to allow the flood water to run from the two branches, and provide a road for the caravans and carts.

At Nan-Houng-K'eon (kilometre 47) the line leaves the right bank of the Min-Ho and continues towards Tsing-Hing-Hien kilometre 56. This section of the line is very difficult, rising in terraces with a grade of 18 to 21%, and crossing the neck by cuttings of 10 metres deep and 650 metres long, all of which could have been avoided had the inhabitants permitted the right of way by the valley.

From kilometre 56 to kilometre 61 the line runs along the right bank of the river and passes over to the left bank by a metal bridge of 75 metres and then enters a curved tunnel 165 metres in length. From kilometre 74, the line again passes over to the right bank by a viaduct of 250 metres, comprising 3 trusses of 50 metres each, with arches of about 10 metres each, and 6 arches more of 10 metres. This point, the conflux of the two great rivers, is dry part of the year, but becomes active during the rainy season. One of the rivers—the Siao-Pe-Ho—takes its source from the north-west, near Ying-Ying. A survey was made from this point to Ping Yuan, but abandoned owing to the heavy grades and other engineering difficulties to be overcome. This valley is rich in anthracite and iron, and the Chinese work a large number of mines and furnaces here. Therefore to avoid the valley of Siao-Pei-Ho, the line follows the right bank of the Mien-Chouei, the other conflux of the river, a very difficult passage. By a series of tunnels, walls, and viaducts with a grade of 12 to 17%, the line ascends the banks of the river, which at this point have an elevation of 60 to 100 metres.

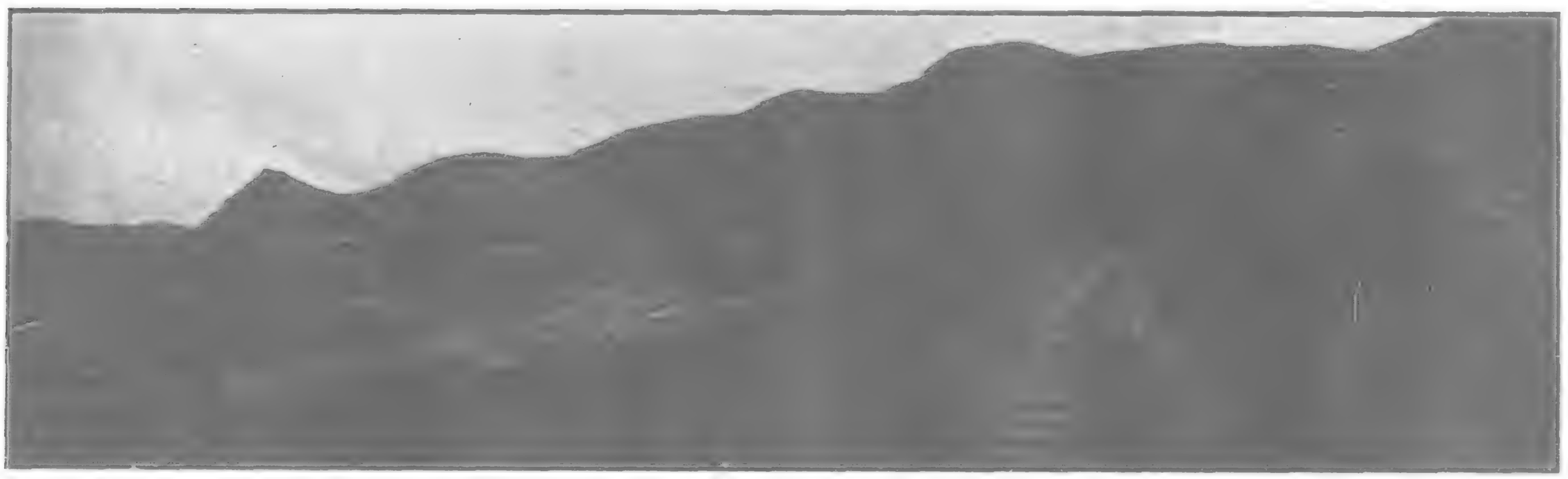
Between kilometre 75 and 90 the line follows the right bank. Here the mountain is pierced by a tunnel of 300 metres in length and the river is crossed by a bridge of 75 metres, together with a viaduct of 10 metres.

The Railway remains on this bank to kilometre 118, and crosses the river again by a metal bridge of 65 metres and two arches of two metres. One thus arrives at the center of the line (kilometre 121) near the point where it borders the Siao-Pei-Ho, and at kilometre 5 of the Sub-prefecture of Ping-Ting Chow the center of the anthracite mining district.

From kilometre 121 the railway is supported on the side of the right bank to kilometre 151, where the river is abandoned to enter a second valley, and arrives at the beginning of a neck (km. 155) of which the elevation is 1,076 metres, whence the line descends the terraces of loess over two or three easy grades to kilometre 231. From there two short sections



SHANSI RAILWAY—THE LINE SKIRTING THE RIVER



SHANSI RAILWAY—CHARACTER OF THE COUNTRY TRAVERSED



SHANSI RAILWAY—THE KM. 170 TUNNEL NEAR KOUO TSUENN



SHANSI RAILWAY—20 METRE ARCHWAY AT KM. 70

COMPAGNIE IMPERIALE
DES
CHEMINS DE FER CHINOIS

LIGNE DU CHAN-SI

ECHELLE DE 1/250000

PROVINCE DU CHAN-SI

PROVINCE DU PE-TCHE-LI

TAI-IUEN-FOU

STATION DE TAI-IUEN-FOU

TCHENG-TING-FOU

STATION DE TCHENG-TING-FOU

STATION DE SIN-LO-HIEN

SIN-LO-HIEN

STATION DE TOUNG-TCHANG-CHOU

STATION DE SI-PAN

PING-CHAN-HIEN

HOU-TOUO-HO

HOUE-LOU-HIEN

STATION DE HOUE-LOU

HALTE DE KA-NGAI-TSUEN

STATION DE CHEU-KIA-TCHOUANG

STATION DE TE'OU-TSUEN

HALTE DE QU-LU-PEU

STATION DE NEI-CHOUEI

HALTE DE PE-NIANG-TCHOUANG

STATION DE KAN-JAO

HALTE DE PE-HAO

TSING-HING-HIEN

STATION DE TSING-HING-HIEN

HALTE DE NAN-HOUNG-TSUEN

HOUILLE

ANTHRACITE

STATION DE LIEN-HOUA

HALTE DE LIEN-HOUA

HALTE DE KIA-PAN-CHEOU

HALTE DE TCHENG-KIA-LOUNG-TI

STATION DE TCHE-CHEU-I

HALTE DE KOU-TSUENN

STATION DE LOU-KIA-TCHOUANG

HALTE DE CHANG-HOU

HALTE DE TOUAN-JING

HALTE DE PE-HO-LIOU

HALTE DE PE-HO

HALTE DE MING-LI

STATION DE TOU-TSE-HIEN

STATION DE CHEOU-HANG-HIEN

HALTE DE POUO-TEOU

STATION DE PE-LIANG-CHOU

STATION DE LOU-KIA-TCHOUANG

HALTE DE TOUNG-CHAO-TCHOUANG

HALTE DE TOUNG-TCHAO-TCHOUANG

CHEOU-HANG-HIEN

PING-T'ING-CHEOU

TSAN-HOANG-HIEN

CHEMIN MUUTIER

YUEN-CHE HIEN

STATION DE YUEN-CHE-HIEN

STATION DE KAO-Y-HIEN

KAO-Y-HIEN

STATION DE TCHENG-KEU

LING-TCHENG-HIEN

STATION DE TE'OU-HIU

LIAO-HO

HOUAI-HO

HOU-TA-HO

TAN-HO

HOU-KIU-HO

TOUNG-HO CHOUEI

SIU-KEOU-HIEN

T'AI-KOU-HIEN

I-U-TZEU-HIEN

YU-HIEN

of the mountain, with grades of 12% are passed to kilometre 236, and thence to T'ai-Yuan-Fu, (kilometre 243) the elevation being 800 metres.

The section between Cheou-Tang-Hien station (kilometre 160) and kilometre 200 is a very narrow winding pass, in which the villages and lands are poor and the crops hardly sufficient to maintain the inhabitants. Seventy-five per cent. of the farms have been abandoned and ruined since the famine of 1901. The opium smoking habit also contributes largely to the misery of the region. Notwithstanding this, this route was chosen for the line on account of its lesser grades.

The study made to the north of Cheou-Tang-Hien, passing through the valley of Ping-Teou and the neck of the Nan-Tchouang, includes grades and curves of 25 millimetres and tunnels of 150 to 500 metres, entirely in the loess. It is regrettable that these cannot be avoided as this valley is very rich in agriculture, is prosperous, and the railway would be near the coal pits of Cheou Tang-Hien and of T'ai- Yuan-Fu.

To sum up, the Shansi line is made of heavy grades. From kilometre 24 to kilometre 160, there are grades of 17% maximum, and from kilometre 160 to kilometre 243, the curves and grades are not more than 12%. It would appear as though the railway could be constructed in a normal way, if the grades were the only obstacle, but the curves of 100 to 150 metres radius could not be reduced without enormous expense, whereas in general, the curves of 100 metres radius are at points where it was necessary to make trusses from 8 to 10 metres high, and to augment the curves tunnels of great length had to be pierced.



SHANSI RAILWAY—THE BRIDGE AT KM. 144. THIS BRIDGE IS 105 METRES LONG AND 26 METRES HIGH

The approximate cost of a metre gauge line to unite T'ai Yuan-Fu and Cheu-kia-Tchouang, as the Chinese Government wanted, was estimated at a minimum sum of 80 million francs.

Earthwork and Track.

We have said that the work began in June, 1904. To Houe-Lou-Hien (kilometre 16) the earthwork in the loess was done quite rapidly with Chinese labor. From kilometre 24 the important work begins. After crossing the T'eou-Is-Yuen river over a bridge of 40 metres, the line runs over gullies in calcareous rocks, and under the Imperial post road over a loess filling 15 metres high. From kilometre 26 to kilometre 33 it is supported on terraces of loess, then runs through the tunnel of kilometre 43, which is 150 metres in length. The opening of the tunnel was a little difficult as the rocks, although hard, were cracked and intersected with pockets of clay.

Several routes were studied to bridge the Hsi-Hou-Ho river. Ordinarily it would appear more rational to make the crossing above the conflux of the two rivers, but this was impossible, so it was necessary to have three trusses of fifty metres each: then a grade from 23 to 30% traversing the village of Nan-Houng-K'eou.

It was more feasible to cross over the delta where the two rivers meet, and although costly this passage was cheaper than a crossing higher up the river.

In order to protect the embankment on the delta against the swift current of the Hsi-Han-Ho, there is a stone facing between the abutments of the 10 metres bridge and the 50 to 00 metres bridges; the facings are protected by masonry deflecting groynes which receive the first shock of the current. The water is imprisoned between the four masonry walls and then run off slowly, acting as a buffer against the shock of the following current.

Other facings protected by groynes and fillings were constructed to preserve the embankment against the strong current of the Mien-Chouei. The groynes were built over a masonry foundation carried below the bed of the two rivers, to avoid undermining. During



SHANSI RAILWAY—A LEVEL STRETCH



SHANSI RAILWAY—ONE OF THE VILLAGES THROUGH WHICH THE LINE PASSES

the floods of 1905 to 1910 the embankment withstood the strain satisfactorily.

From kilometre 40 to kilometre 56 the line runs through the loess in embankments approaching 17 metres high, and a cutting of 650 metres long and 10 metres deep.

Great difficulties were encountered at kilometre 58. To cut down 60 metres of rock would have been expensive, as the rock was very hard, so it was found more economical to bridge over 50 metres and build a wall 100 metres long beyond kilometre 59.

The tunnel from kilometre 61 is pierced in hard rock, and emerges on a bridge of 75 metres, with a relieving arch of 10 metres. The rise is made by means of a service bridge with latticed beam, of 12 metres bearing, which serves also for the machines during the erection and rivetting of the bridge.

All the timber for temporary and false work used in bridge construction at kilometre 40, 60, and 61 was carried by coolies and then floated down the river. For the other big bridges the timbers were also carried by coolies and it was remarkable how the Chinese handled beams from 12 to 15 metres in length along the winding paths up steep mountain sides.

To diminish the difficulties, in floating the trusses temporary bridge were made of latticed beams, of 12.40 metres, the small timbers for which were carried by mules and donkeys, and the larger pieces by coolies.

Fifty metres from this metal bridge is a half-tunnel cutting over 30 metres long. The line continues over the flank of the mountain, profiting by all the ruggedness of the rock to act as supports for spans of 5 and 10 metres. The ravines are crossed by three viaducts with arches (of 10 metres), and piers 8 to 12 metres high. From kilometre 71, the ravine is passed by an arch. This bridge, as well as the preceding viaducts, were remarkably well constructed by a Chinese expert who, at the beginning, refused to accept the design; but under the influence of the Engineer-in-Chief he did the masonry in a way that could not be improved upon in Europe.



SHANSI RAILWAY—M. MILLORAT, ENGINEER-IN-CHIEF, UNDER WHOSE SUPERVISION THE LINE WAS CONSTRUCTED

Viaduct of Gniang Tzeu Kouan.

The largest viaduct on the line is at kilometre 74, and is situated at the foot of the town of Gniang-Tzeu-kouan. The railway follows the steep left bank of the river. On the right bank stands the town of Gniang-Tzeu-kouan, which extends over a plain to the foot of the mountains. This viaduct is 250 metres in length.

The first abutment was built over several springs spouting great jets 10 centimetres in diameter. After much excavation springs burst out and it was too late to change the direction; the sides of the cuttings had been well advanced and it was considered probable that had a change been made other springs would have been met with. The springs were plugged up with solid semi-crystaline limestone forming arches in some places and level in others. It would not have been possible to fill the springs by running in cement concrete: that would have been washed away at once. The base of the foundations was strengthened by placing large flat stones as close as possible one metre high on each side of the springs after having built the piers of the arches of limestone. Over these rough stones a rough box was placed as a frame for the masonry to take a massive concrete pier over 2.60 metres high, and round pillars were built over this.

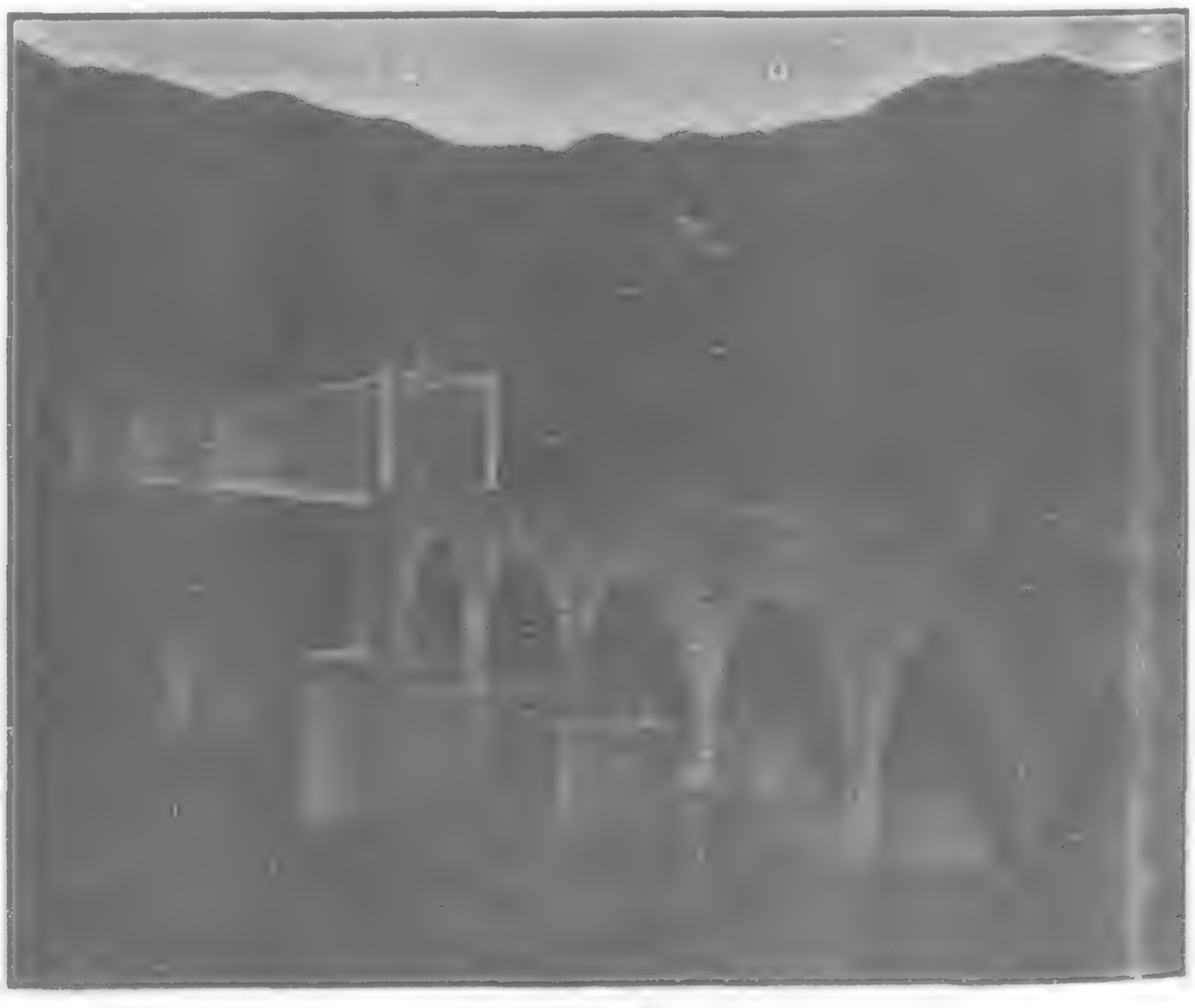
The construction of other columns did not present any difficulty. After freeing the foundations of water the engineers built the three pillars to two vaults of 10 metres with a viaduct of 100 metres radius.

From kilometre 75 to kilometre 90 the river runs straight, with perpendicular banks. It was impossible to lay the line on the river banks owing to the possibility of it being washed away, as the waters rise as much as 8 to 10 metres in a night and an embankment of 12 metres would have been necessary. The direction taken was judiciously chosen to avoid high supporting walls to the deep cuttings. It was necessary in many cases to pierce a tunnel in the steep banks.

In these 15 kilometres there are five tunnels, of which two are 300 metres long, all on curves. The others vary from 130 to 170 metres long. To expedite the piercing of these tunnels operations were commenced simultaneously. One of the 300 metre tunnels, which could be opened in two points only, was completed in seven months, the work being



SHANSI RAILWAY—BRIDGE OF THREE 10 METRE ARCHES AT KM. 70



SHANSI RAILWAY—VIADUCT ACROSS THE GNIANG TZEU KOUAN AT KM. 73



SHANSI RAILWAY—OVERHEAD WAY AT CHEU KIA TCHOUANG

done at the rate of 1.40 metres per 24 hours work. During these seven months, one month was lost through Chinese holidays, New Year, Dragon festival, etc. All the work, together with the masonry, was done by a Chinese contractor.

At this place seven large viaducts with arches of from 5 to 10 metres span, were constructed, as well as a metal bridge of 75 metres with arches of 10 metres, being an exact repetition of the approach to kilometre 61.

The cutting entered on emerging from the tunnel at kilometre 87.800 is through loess with sides 26 metres high.

The construction from kilometre 90 to kilometre 188 was particularly difficult owing to the quality of the rock met with, especially in the tunnels, where fissures and pockets of clay to the full depth of the tunnels were found. In this locality there are several large viaducts with spans of from 8 to 10 metres. The river is crossed at kilometre 188 by a bridge of 65 metres and two arches of 10 metres each. These large spans were preferred, in certain points, to avoid constructing high piers in strong currents with doubtful sub-soil, and to minimise the risk of bad masonry by Chinese workmen.

From kilometre 122 to kilometre 151 the railway skirts the side of the mountain, is laid on beds of anthracite, several cuttings being in seams of coal. There are four cuttings from 20 to 26 metres deep in the loess, and one, practically in sandstone, with sides 40 metres high. The small and the large ravines have necessitated a large quantity of variable and important work.

At kilometre 144 is found a piece of the finest railway work in central or North China, a stone viaduct 90 metres long. The centre span is 20 metres, and the outer ones 10 and 5 metres. The rail is 19 metres above the bed of the river. This viaduct was built of beautiful sandstone piers by Chinese workmen, under the direction of the Chief Engineer.

From kilometre 151 to kilometre 170 the earthwork is through loess.

A sinuous defile with high and steep banks of red sandstone is penetrated to Chang Hon The water rises to 10 or 11 metres over the thalweg and the swellings are signalled by the countrymen. Several cuttings could have been avoided by crossing the river in several places by metal bridges of less than 75 metres. It was preferable to cut the banks on account of the difficulty of procuring good stonework in this part and also because earthwork is cheaper even though the curves of the bank had to be followed.

From kilometre 155 to kilometre 195 there are 850,000 cubic metres of earthwork, of which two-thirds are red sandstone: in this same portion there are five tunnels varying from 120 to 160 metres in length, a bridge of 50 metres of broad gauge, a bridge of 100 metres (two trusses of 50) and a bridge of 75 metres at kilometre 191. From kilometre 202 to kilometre 243 (sampan harbor of Tai-Iuen Fou) the earthwork shows nothing in particular.

It seems indiscreet to make cuttings 20 metres deep in the loess. It was impossible to evade this. It would also seem improbable that the loess would remain upright at these great heights, but it may be remarked that the loess upon which the sun shines during the summer remains vertical and supports a great weight, whereas the cuttings are made in the beginning of winter when the loess in a little wet, the latter freezes, and thaws, and can later be seen breaking away in slabs of from 30 to 40 centimetres thick along the whole length of the sides.

The small bridges up to three metres span are of wood. In places they are steel beams of 5 metres, 6 m 40, 7 m 60, 10, 20, 40, 50, 65 and 75 metres capacity.

The load calculations for the bridges were made on the French principle of August 1891. They were based on the hypothesis employed by trying one or several trains composed of two locomotives of 45 tons each, followed by wagons loaded to 30 tons. The trials were very severe and gave every satisfaction.

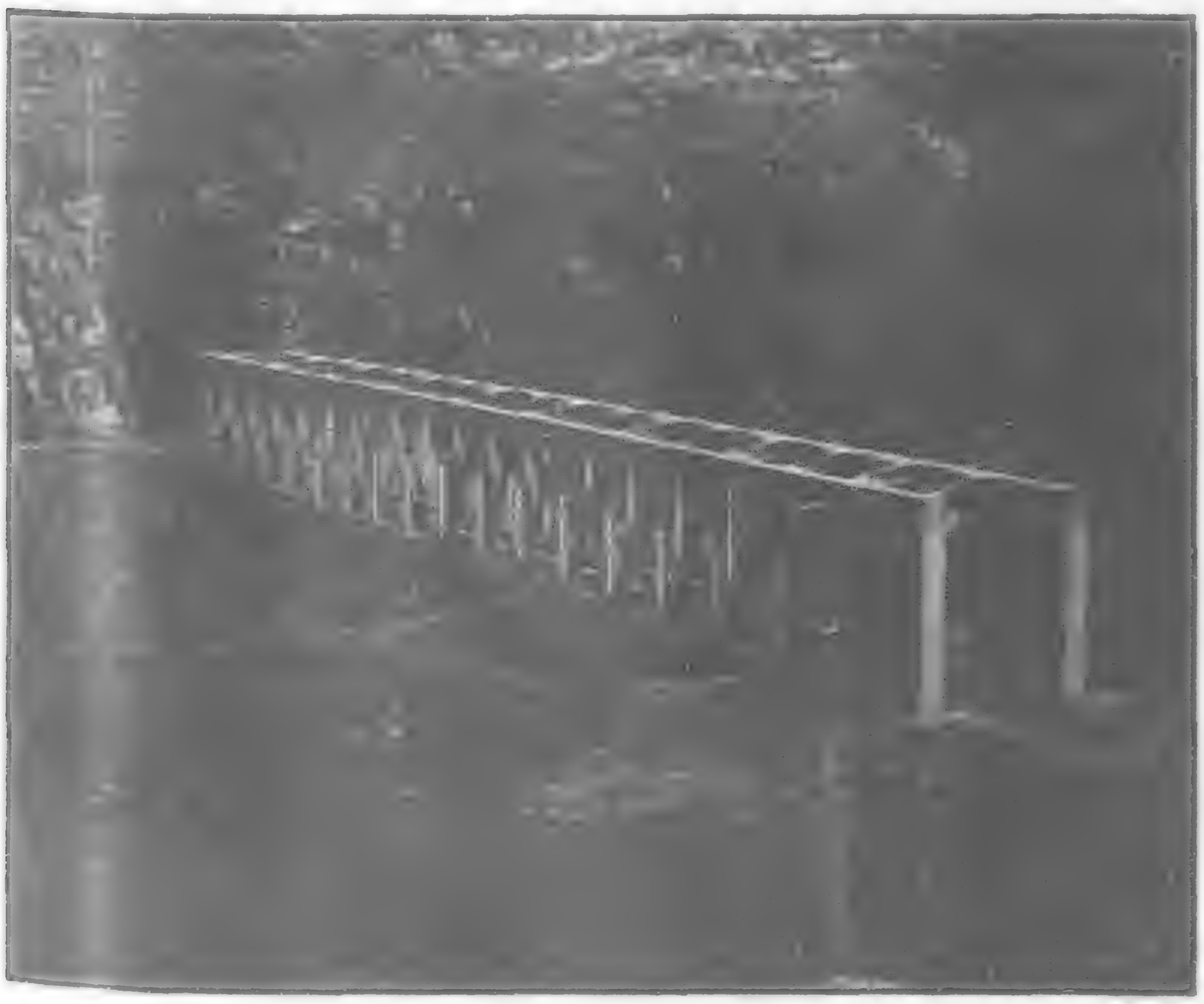
Superstructure.

The track is 4 metres wide. The width inside the rails, in the curves of a radius of 300 metres and over, is 1 metre, and in those of lesser radius 1.015 metres.

The steel rails are of the Vignole type weighing 28 kilogrammes per metre, nominally 9 inches long. They are fixed by steel turrels with intermediary saddles on wooden sleepers.

All the sleepers are of Narawood (Japanese oak) and Tamo (Japanese beech). The sleepers are normally spaced Om 225×Om 15.

The splints are in steel of Om 45 in length and weighing 5.625 kilogrammes for the interior splints and 5.475 kilogrammes for the exterior splints. They are pierced with four



SHANSI RAILWAY—75 METRE BRIDGE AT HSIA PAN CHEU



SHANSI RAILWAY—STEEL BRIDGE OF 75 METRE AT KM. 190



SHANSI RAILWAY—TWO VIEWS ILLUSTRATING THE CHARACTER OF THE COUNTRY THROUGH WHICH THE LINE PASSES

holes. The saddles join the splints in a way to oppose the displacement of the longitudinal rails.

After laying the inside rails of the curves of 300 metres radius turrels were placed over a certain number of sleepers to prevent the displacement of the rails.

The rise of the exterior rail was calculated on a supposed speed of 32 kilometres per hour; it is Om. 08 for a radius of 100 metres. Nevertheless a speed of 40 km. and 45 km. on curves of 100 is made daily.

Several companies use a rise in relation to the gauge, with its level over the axis, and lower the inside rail the same amount as they raise the outer one. The engineers of the Shansi Co. preferred to raise the outside rail and maintain the level of the axis of the inside one. When between two curves of 100 metres radius the laying out of a line is very simple, and is arrived at in several ways, the one adopted was by parabolic levelling where the displacement of the curve permitted.

Where two successive declivities differ more than one millimetre per metre they were joined by a series of inclined planes nine metres long differing between themselves with slopes equivalent to two millimetres per metre.

Material and Traction.

The working locomotives were designed with capacity to two relatively heavy trains over slopes often exceeding 20 m/m, and comprised the following.

32 Engines, Series 100; 6 Engines, Series 200; 12 Engines, for construction; 1 Engine, for normal gauge.

The engines series 101 and 201 are furnished with Clayton hand clamps for detaching purposes.

One locomotive, series 101, has a pulling capacity of 8 wagons of 30 tons each in winter and 9 in summer, of 11 tons tare and 20 tons, working over slopes of 15 m/m at 15 kilometres per hour.

One locomotive, series 201, has a hauling capacity of 10 carriages over slopes of 21 m/m at 22 kilometre per hour. They are specially attached to passenger trains.

A speciality of these locomotives is the position of the driver which allows him to see the signals and the road unhampered by either escaping steam, or smoke from the funnel. In effect, the ideal working position of these



SHANSI RAILWAY—THE ENTRANCE TO THE TUNNEL AT KM. 97

engines is with the chimney to the rear. Other engines, series 201, have a water tender attached to them.

The passenger carriages are: 3 first class carriages; 10 mixed (1st and 2nd); 25 third class; 7 carriages for the chief engineer, of which one was of normal gauge for use from Cheu Kia Tchouang to Peking and Tientsin.

The first class and mixed carriages have side passages to the lavatory; they are provided with hand clamps for attaching and detaching. They have covered platforms at each end. The first class carriages have seats for 14, and the mixed for 20 passengers.

The third class carriages have seats for 23 passengers on each side with a passage in the centre. These have also a covered platform, and a lavatory, and are attached and detached in a manner similar to the first-class carriages.

Three third-class and one first-class carriages were converted for the use of the engineers and supervision staff; the furnishing of these carriages includes dining-room, sitting-room, bed-room, kitchen and toilet, etc.

All the carriages were built on bogie chassis with wheels of O M 70 diam. The carriages are hooked in sets and heated by steam from the engine.

The length of the chassis is 9.16 m. the width 2.60 m and the height of the frames 2.527. The platforms at each end are O. 75 m. wide. The total length over all is 12.21 m. The tare weight of these carriages averages 25-50 tons; the first class are 16 tons.

There are 8 postal and 8 luggage vans, built on chassis of the same dimensions as the carriages, and are divided into two compartments, with a lookout or glass covered observation seat in each compartment.

The luggage vans have an air valve in the guard's compartment, surmounted by an indicator which works the brakes for a quick stop, these valves work automatically when the driver applies his brake or they may be operated individually by the guard.



SHANSI RAILWAY—TYPICAL STEEL BRIDGE OF 50 METRE AT KM. 180

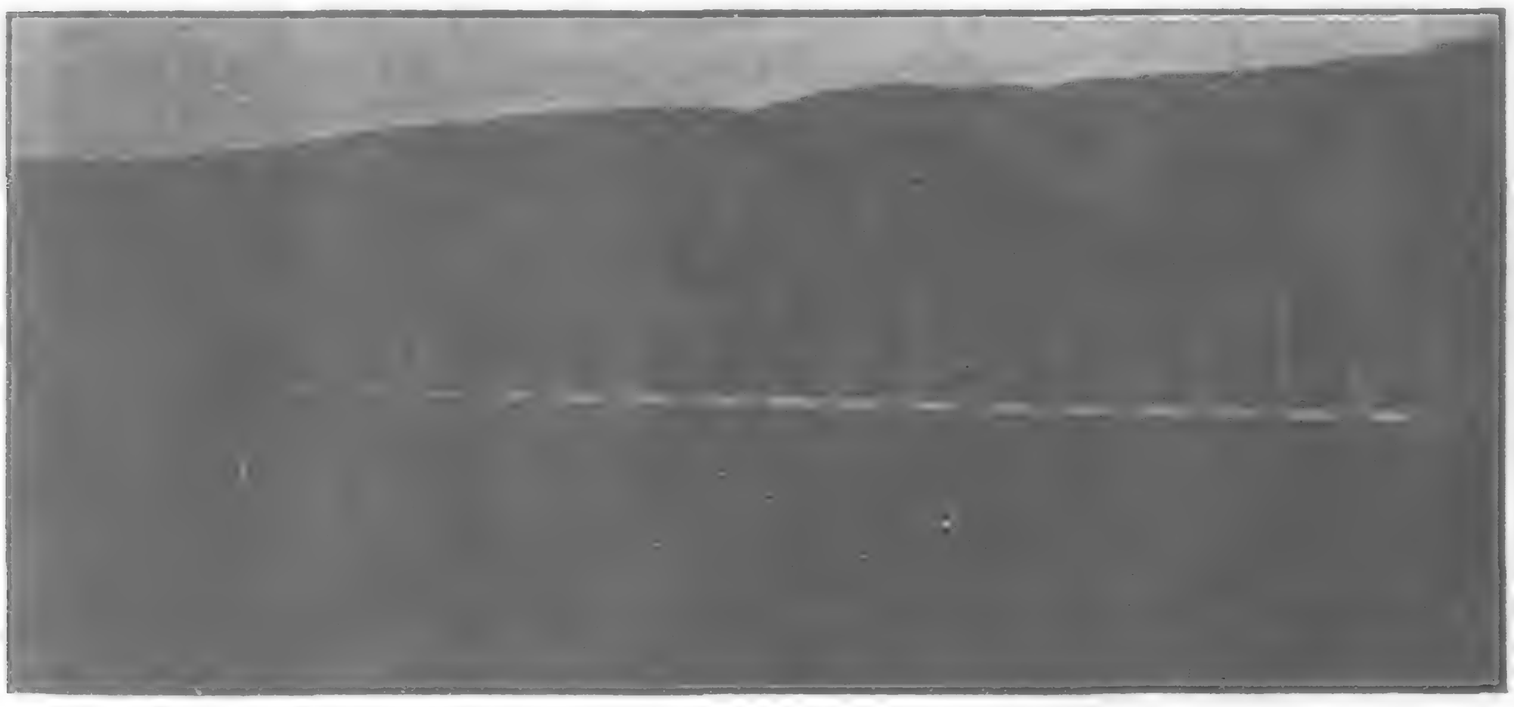
There are 440 of these wagons and comprise the following:—

Blind wagons 2; covered 80; flat stepped 10; tilting or dumping 196; high sided 40; medium high 38; tank 6; assisting 2; extension bogies 4; P. F. 27; N. F. 36; 3 bogies and two frames, 1 with special attachments.

The chassis of the covered wagons are 8.20 m. long and 2.20 m. wide, the frame 8.45 m. long and 2.39 m. high; with a covered passage at one end. They have sliding doors. Some of the goods wagons have windows and others have a compartment for the guard

The coal cars are 8.40 m. long and are intended for the transportation of anthracite and oil. They are 11 tons and carry 20 tons, 25 of them are larger (10.26 m) and carry 25 tons.

The chassis of the flat wagons are 9.22 m. over 2.20 m. Some of these have platforms 0.40 m. high whilst others have steps fixed to the side of the chassis.



SHANSI RAILWAY—65 METRE BRIDGE AT HSIA OU TOU

The bodies of these wagons are 8.60 m. long and 1.22 m high; with a platform all around. They weight 11.5 tons empty. They are in daily use for the transport of very large blocks of anthracite. The sides are not strained by this work.

The tank wagons have a capacity of 25.3 m. and are mounted on chassis measuring 9.20 m. long (inside measurements). They are intended for the transport of petrol. Two of these, which are in different shape from the others were made in the workshop at Cheu Kia Tchuang.

There are 66 of these wagons of which 30 are similar to the flat wagons and carry 30 tons, the remaining 36 are smaller, 7.06 m. in length (over all) and carry only 10 tons.

There are three workshops for repairs, one at Cheu Kio Tchuang, one at Iang Ts-Iuen, and one at T'ai Yuan Fou.

HONOURS FOR RAILWAY-MEN IN CHINA

RAILWAY MINISTER'S RECOMMENDATIONS

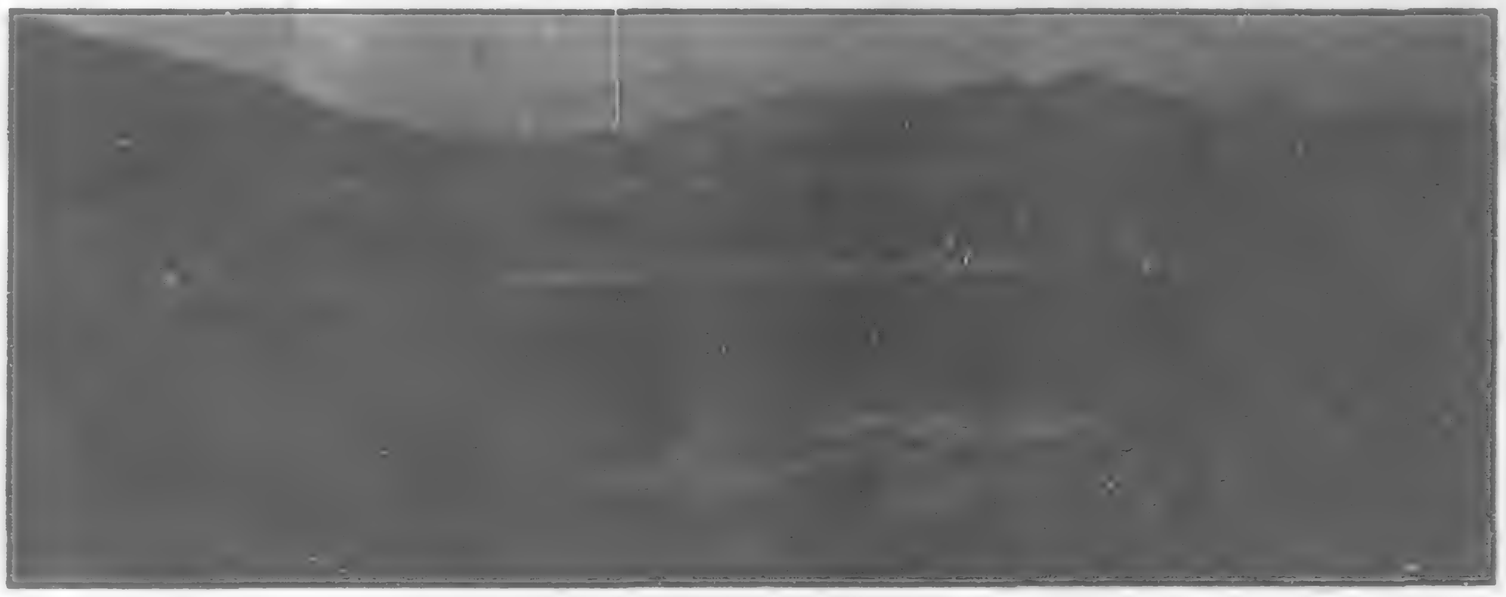
The following have been recommended by the Minister of Posts and Communications for honours:—

FIFTH CLASS: of the Chia Ho or "Felicitous Grain"

A. W. U. Pope, General Manager, Shanghai-Nanking Railway.
M. Bouillard, Chief Traffic Manager, Kin-Han Railway.
M. Ebray, Chief Engineer, Pienlo Railway.

SIXTH CLASS;

J. E. Foley, Traffic Manager, Peking-Mukden Railway.
W. Henderson, C.A., Chief Accountant, Peking-Mukden Railway.
D. P. Ricketts, M.I.C.E. Engineer-in-Chief, Peking-Mukden Railway.



SHANSI RAILWAY—75 METRE BRIDGE AT KM. 190

A. G. Cox, Asst. Engineer-in-Chief, Peking-Mukden Railway.
M. Orphanides, Chief Engineer Maintenance Dept. Kin-Han Railway.
J. Barber, General Manager, Taokow-Chinghua Railway.
E. R. Morriss, Secretary, Shanghai-Nanking Railway.
A. C. Clear, Supt. Permanent way and works, Shanghai-Nanking Railway.
Frank Grove, Engineer-in-Chief, Canton-Kowloon Railway (Chinese sec.).

SEVENTH CLASS:

M. Marchand, Chief Engineer Locomotive Dept., Kin-Han Railway.
W. H. Steele, Asst. Traffic Manager, Peking-Mukden Railway.
A. de Challoy, Acting Supt., Locomotive Dept., Tcheng-tai Railway.
R. Lallemand, Engineer-in-Chief, Tcheng-tai Railway.
J. de Lapeyiere, Chef du service des voies et travaux, Tcheng-tai Railway.



SHANSI RAILWAY—STEEL BRIDGE AT KM. 185

KIRIN-CHANGCHUN RAILWAY



KIRIN-CHANGCHUN RAILWAY—BIRD'S-EYE VIEW OF KIRIN CITY



KIRIN-CHANGCHUN RAILWAY—TRACK LAYING NEAR KIRIN

In the November number of the FAR EASTERN REVIEW we announced that the Kirin-Changchun Railway had been opened for passenger and goods traffic on October 21st. Some particulars of the line were then given, but these we are now able to supplement, and also to reproduce some photographs illustrative of the country through which the new railway passes. The information is not so full as we would like to have made it, as the final figures in regard to the cost of construction are not yet available.

The line connects Kirin, the capital of the province of that name, with Changchun, the point where the Japanese and Russian systems in Manchuria meet. Its length, exclusive of sidings, is 79 miles. The temporary line leading to the cut over the Tumenling Pass has a gradient of 1 in 30, but the use of this temporary line will of course, be discontinued as soon as the tunnel is completed. The maximum gradient on the line proper is 1 in 100 and the radius of the sharpest curve 1,320 ft.

The total bridge openings amount to 3,926 ft. and the total culvert openings to 133 ft.

Although, as already stated, owing to the final figures not being available we cannot give the total cost of construction, we understand that up to the end of October, 1912 Tls. 3,500,000 had been spent. This includes the cost of construction of the line, buildings, rolling stock and shops; the price paid for land, salaries, and general expenses.

The traffic returns for November were as follows:—

Passengers	$28,968.65
Freight	$34,971.34
Total.....	$63,939.99



KIRIN-CHANGCHUN RAILWAY—YIU CHEN TSE STATION



KIRIN-CHANGCHUN RAILWAY—APPROACHING THE TUMENLING PASS



KIRIN-CHANGCHUN RAILWAY—CHANGCHUN STATION AND STAFF



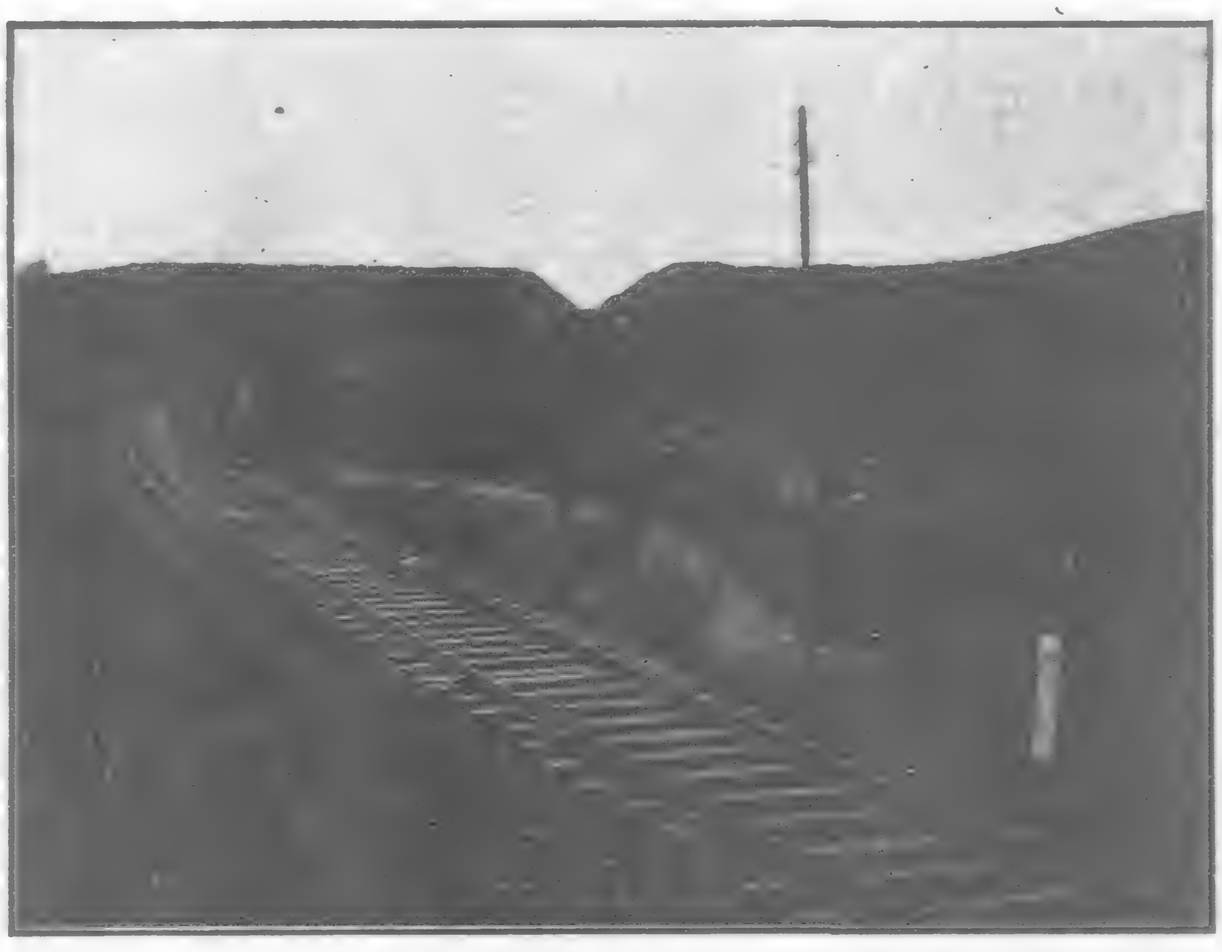
KIRIN-CHANGCHUN RAILWAY—A STRAIGHT RUN NEAR KA LUN



KIRIN-CHANGCHUN RAILWAY—YI-TING HO BRIDGE



KIRIN-CHANGCHUN RAILWAY—THE SUNGARI RIVER AT KIRIN



KIRIN-CHANGCHUN RAILWAY—APPROACHING THE TUMENLING PASS FROM THE WEST



KIRIN-CHANGCHUN RAILWAY—SEVENTY FEET CUTTING AT SAN-TO LIU



KIRIN-CHANGCHUN RAILWAY—HUA PI CHAUN DECK TRUSS

By the treaties between China and Japan signed in 1907 and 1908 the Japanese Government was to furnish *Yen* 2,150,000 through the South Manchuria Railway, towards the expenditure. The chief engineer and head treasurer are Japanese, but the entire management rests with the general manager appointed by the Chinese Government. The present general manager is Mr. T. C. Sun, an able and energetic official.

Work on the line was started in December 1909. Surveys were started from both termini. The first Chinese manager was Mr. Fu Po-liang. The work of construction was retarded owing to several changes in the management, and also by the severe climate. Even at the beginning of May the ground is found to be freezing at a depth of one foot. Practically construction work could only be carried on for five months in the year. The work was also delayed by the outbreak of plague.



KIRIN-CHANGCHUN RAILWAY—YIN-MO HO BRIDGE

The commercial possibilities of the line are most favourable, and it is believed that a great deal of the traffic that is now borne on the Sungari will be transferred to the quicker route.

ROLLING STOCK

2 Shunting Engines
7 Freight and Passenger Engines
1 Private Car
4 First and Second Class Composite Cars
10 Third Class Passenger Cars
1 Thirty ton Freight Car
40 Thirty ton Covered Cars
10 Twenty ton Covered Cars
27 Thirty ton Coal Cars
20 Thirty ton ballast Cars
4 Brake vans.

MANILA'S WATER SUPPLY

800,000 GALLON RESERVOIR PROJECTED.

The old scheme to utilize the flow from the Pagsanjan falls for Manila's water supply to insure a sufficiency for all times of the year, which was revived recently to the extent of being submitted to the acting governor general with recommendations, has probably reached its last resting place, in the hands of Chief Engineer A. Gideon of the department of sewer and waterworks construction, to whom it was referred on December 27 by the municipal board.

Mr. Gideon explained, when questioned by a *Manila Daily Bulletin* representative, that engineers from his department are now in the field locating sites for additional storage reservoirs to connect with the present source of supply from the Mariquina river at the Montalban dam. Two sites are already in view, said Mr. Gideon, on the Manila side of the Mariquina river. One has been surveyed and the bureau of science has been asked to send geologists to determine if the ground is sufficiently water tight to warrant building a dam. The other site is a mile and a half nearer the city and is being investigated with a view to economy of construction and desirability of location.

The plan is to construct a storage reservoir of eight hundred million gallons capacity. This alone, Mr. Gideon stated, would hold enough water to supply the city of Manila for sixty days and would meet the requirements for a number of years. During the flood season, he explained, 60,000 cubic feet of water a second flows over the Montalban dam and goes to waste, while in the dry period the volume dwindles to only six cubic feet. The quantity of the overflow during the rainy season, he said, is 13,000,000 gallons every half minute, which is enough to supply the city for a whole day. The Montalban dam reaches a depth of 40 feet and the chief engineer asserted that repairs during the year have reduced the leakage from 28,000,000 to 14,000,000 gallons a day. The total flow during the dry weather now is 11,000,000 gallons a day, which is about 2,000,000 gallons short of the city's requirements. With the proposed 800,000,000 gallon reservoir in addition to the three now in use the supply will be brought up close to the present pipe line system capacity, which is 22,000,000 gallons a day. It is estimated that the consumption will reach this limit by about 1925, when additional piping will have to be laid.

RECONSTRUCTION OF CANTON

The fire which took place in Canton on the night of November 9th, says a correspondent writing to the *Hongkong Daily Press*, may be a blessing to the city, if not to the few insurance companies who have to liquidate their business because of the heavy losses. The Government, according to Mr. H. L. Wu, Acting Superintendent of Public Works, will take a new survey of the burned district and cut the land into blocks, and will not issue any new permits for buildings until the rules and regulations for the improvement of that district into a modern city are complied with. The Governor-General, Wu Hon-man, has already signified his approval of the plan and will formally put the rules into force as soon as they are ready in detail.

Superintendent Wu is acting for Mr. R. C. Johnson, who is travelling with Provincial Treasurer Liu to Peking on financial business connected with the Government. Supt. Wu will have the opportunity to plan for Canton, at least a part of it, a modern town. Supt. Wu is a graduate of Canton Christian College and the University of Illinois. He is one of the many foreign educated young men now governing Canton.

The *Manila Daily Bulletin* of December 19 reported that the installation of the Otto suction 75 horse power gas producing plant at the bureau of science, medical school, and Philippine General Hospital, for generating electricity has been completed. The contract calls for three months of operation absolutely free during which time it must give complete satisfaction or the firm that installed it must tear it down and remove it.

An expert was sent to Manila from Germany to superintend the erection of the plant, which was designed especially for Bataan coal fuel and 500 tons of the product of the Bataan mine has been laid in. This amount, it is claimed, will operate the plant for a period of two years and generate electric current for all purposes. Mr. McGregor, chief of the building department of the bureau of public works, stated that if the Bataan mine resumed operations it was likely that more of these gas plants would be installed, as current can be supplied by this means very cheaply.

SUGAR IN THE PHILIPPINES

The reports of the exports of Philippines sugars show that there were 110,604 tons in 1909 and the exports rose to 183,077 tons during the fiscal year ending June 30, 1912, reports the *Louisiana Planter*, and continues:—As is well known, these sugars produced in the Philippines and thus exported are generally of very low grade and similar to that vast crop of over two millions of tons of cane sugars made in India and consumed altogether at home.

Now, for the first time, a more modern style of sugar house has been equipped and put in operation near La Carlota in western Negros and a small mill was erected with a capacity of grinding 150 tons of cane per day. We understand that this was turned out in the usual vacuum pan style, with centrifugal purging machines and that the sugar brought 4½ cents in Iloilo from the wholesale dealers. It is stated that a number of small mills are now being constructed at other points, and a large one at San Carlos.

A large cane mill has been completed on the San Jose estate on the southern part of the island of Mindoro, but this season it will only be used for reboiling low-grade sugars and making them over into higher grades, or semi-refining them. It was reported that on this estate some 2,500 laborers were at work preparing land and planting cane, with 800 acres already planted.

These vacuum pan and centrifugal sugar houses, producing hard crystals of sugar instead of the soft muscovado sugars hitherto produced, will quickly work a revolution in the sugar industry in the Philippines. The Hawaiians are now making about ten times as much sugar as they thought was their extremest limit less than forty years ago. Things move more quickly now in these days of big steamships and wireless telegraphy, and the Philippines are apparently as near to us, or nearer even, than the Hawaiians.

ROYAL STATE RAILWAYS OF SIAM

REPORT FOR THE YEAR 130 (1911-1912)

The Royal State Railways of Siam are making slow but steady progress. In the excellent administration report for the year 130 (1911-12) presented to H.E. Chow Phya Wongsa Nuprabhadh, Minister of Communications, by the Director-General of Railways, Mr. L. Weiler, on August 28, 1912, it is stated that the total length of line open to traffic was 951.8 Km. Since the report was issued, however, an additional 71.2 Km., including the 10 Km. section from Meh Puak to Pak Pan, on the Northern Line, has been opened and consequently the total length of State Railways now open to traffic is 1,023 Km.

Lines in operation:—The report under consideration deals only with the following lines:—

a, Standard gauge:—

	Km.
Bangkok-Korat ..	264.1
Ban Phaji - Meh Puak	437.5
Ban Dara-Sawankaloke	28.9
Bangkok-Petriu	63.4
Branch to Menam River Bangkok	6.5
Total ..	800.4

b, Meter gauge:—

Bangkok Noi-Petchaburi	151.4
Total ..	951.8

Capital:—The capital outlay from the commencement on all open lines amounted at the close of the year 130 (1911-12) to Ticals 61,924,423 as specified in the following list:—

Line	Specification of capital outlay Tcs.
Bangkok-Korat	17,673,189
Ban Phaji-Meh Puak	28,570,640
Ban Dara-Sawankaloke ...	816,582
Bangkok-Petriu	3,424,431
Branch to Menam River station	614,150
Bangkok Noi-Petchaburi ...	8,115,878
Extensions and Improvements	2,661,526
Various Surveys	48,125
Total	Tcs. 61,924,423



ROYAL SIAMESE RAILWAYS—THE PASS TUNNEL AT KM. 426 OF THE NORTHERN LINE, UNDER CONSTRUCTION

Financial Results:—The gross receipts amounted to Ticals 4,623,683 as against Ticals 4,526,765 in the preceding year, an increase of Ticals 96,918 or 2.14 per cent. The working expenses decreased by Ticals 111,717 to Ticals 1,076,779 or 6.24 per cent. The net earnings increased by Ticals 208,635 or 7.62 per cent., to Ticals 2,946,904. Deducting Ticals 327,411, contribution to renovation fund, the actual net profit was Ticals 2,619,493 an increase of Ticals 201,922 or 8.36 per cent. The percentage on capital cost was 4.26, an increase of 0.16 per cent. The estimated receipts for 130 were Ticals 4,285,000 so that this estimate was exceeded by Ticals 338,683, while the expenditure was estimated at Ticals 1,937,032 and consequently a saving of Ticals 260,253 was made.

Revenue:—Receipts from ordinary passenger traffic showed a slight increase of Ticals 17,921, the total receipts from this source being Ticals 2,811,244. The number of passengers decreased from 3,155,160 to 3,132,003. The average fare paid per passenger was Ticals 0.90, and the average distance travelled per passenger was 44.61 Km. There was an increase of Ticals 147,665 in the receipts from special trains, owing to the extensive military transports on account of the Coronation festivities.

Good and Live Stock:—There was a falling off both in the goods traffic and in conveyance of head of live stock in 130 (1911-12) as compared to 129 (1910-11). In 130 the tonnage of goods forwarded was 298,238 as against 314,819 and head of live stock 123,630 as against, 137,699. The financial return fell from Ticals 1,607,006 in 129 to 1,539,859 in 130. It is explained that the falling off in goods traffic was wholly due to the decrease in the paddy traffic in February and March. The average receipt per ton was Ticals 5.01 and the distance goods were carried averaged 184.08 Km.

Rolling Stock:—At the close of the year the rolling stock in hand was:—

67 locomotives
250 coaching vehicles
944 goods vehicles

The number under order was:—

2 locomotives
11 coaching vehicles
20 goods vehicles.

Damages by floods and rainfall:—1). North line. Owing to heavy rains slips occurred in various cuttings of the newly opened section between Pang Ton Pung and Meh Puak and caused interruption of the traffic from 8th to 10th September—3 days.

2). Petchaburi line. In consequence of torrential rains causing damage to banks and bridges, through communication was interrupted between Ratburi and Petchaburi from the 22nd October to 2nd November—12 days.

Personnel:—The total number of railway employees at the end of the year under review was 2,710 as against 2,904 in the previous year.

Improvements and Extensions:—The sum of Ticals 137,333 was spent for improvements and extensions on the lines open to traffic.

Utaradit-Mehpuak Line

History of the line from Utaradit (Tha Sao) to Meh Puak (Km. 399.0 to 437.6), opened to traffic:—

Tha Sao—Pang Ton Pung 15th August 1909.
Pang Ton Pung—Meh Puak 1st June 1911.

When in April 1909 the Government decided to postpone the continuation of the Northern Line, Sala Meh Puak was taken in view as the temporary terminus owing to its close vicinity to Muang Prae and in consideration of the works having already advanced to a considerable extent so far. Construction works on the section under report were commenced in February 1907. On 15th August, 1909, traffic was opened to Pang Ton Pung (Km. 418.5) at the foot of the hill range which forms the waterparting between the Menam Yai and the Meh Yom. The crossing of the range was connected with various engineering difficulties. A series of banks and cuttings of over 20 m height and depth respectively, had to be negotiated and at Km. 422.3 to 423.3 it seemed advisable for economical as well as technical reasons to construct a tunnel of 109 m and a viaduct of 82.6 m length in substitution of a cutting and a bank measuring 33 m in depth and height respectively.

The Kao Plung pass at Km 425.8 was pierced by a tunnel 362 m long 70 m below the pass and 182 m above Formation Level at Utaradit (Tha Sao). The incline leading to the pass has a maximum grade of 20% whereas the sharpest curves have a radius of 200 m.



ROYAL SIAMESE RAILWAYS—THE TOWN OF SAWANKALOPE ON THE MEH TOM

The cost of the line amounted to Ticals 3,846,534.

The cost per kilometer was Ticals 99,651,. and represents the maximum on record for the Siamese State Railways, owing to the aforementioned technical difficulties.

Tracing and surveying.—The Ticals 161,297 spent for this item include the various survey works as far back as 1900 in search of a suitable route for the Northern Line at a time when it was not yet decided whether the Railway should be laid through Raheng or Utaradit, Especially, this amount includes the survey of a route over the Muang Li pass between the Meh Wang and the Meh Ping, a route from Sawankaloke along the Meh Yom to Muang Long, detailed surveys of the crossing of the range dividing the Meh Yom from the Meh Wang over the Muang Long and the Pang Buei passes.



ROYAL SIAMESE RAILWAYS—BRIDGE OF THREE 13 METRE SPANS AT KM. 419.9 OF THE NORTHERN LINE

Earth and Rockworks.—2,697,547 cbm. of earth and rock had to be turned and blasted, the total outlay amounting to Ticals 1,591,681 at Ticals, 0.94 per cbm.

Bridges and Culverts.—Total amount spent Ticals 362,549 at a cost of Ticals 9,392 per Km. Owing to the expensiveness of the means of transport great care has been taken to reduce bridging to the utmost limit. A number of gaps have been filled allowing the water either to percolate through the bank by drains made of stonepacking or to overflow the bank by rail openings. In many cases no outlet whatever for the water was provided for, owing to the rocky nature of the soil used for the construction of the embankments.

Tunnels.—As already mentioned 2 tunnels had to be bored of 109 m and 362 m respectively in length. Total cost Ticals 347,837: cost per running meter Ticals 739.

The smaller tunnel has been lined with bricks and the pass tunnel with concrete owing to its being more wet. Iron centerings were made use of for the lining work and afforded great facility.

Permanent way.—The usual type of the broad gauge Railways was used.

Stations.—There being only a few stations, namely, Ban Dan, Pang Ton Pung and Meh Puak, which have been provided with ordinary wooden structures for the station service and the housing of the officials, the total amount of Ticals 60,311 seems rather high. This is due to the rule to account under this item the quarters of the construction staff; and in this special case the amount includes also all quarters



ROYAL SIAMESE RAILWAYS—THE BRIDGE OVER THE MEHNAM AT KM. 366 OF THE NORTHERN LINE, UNDER CONSTRUCTION. THIS BRIDGE HAS SPANS OF 80×100×80 METRES



ROYAL SIAMESE RAILWAYS—BRIDGE OF 40 METRES AT KM. 420.1 OF THE NORTHERN LINE, UNDER CONSTRUCTION

Royal State Railways

Sketch Map

of

Railways in Siam.

แผน ที่ แสดง ทาง รถ ไฟ ใน

กรุง สยาม

ทาง รถ ไฟ หลวง

State Railways.

รถไฟหลวง State Railways.

รถไฟบริษัท Private Co. Railways.



ROYAL SIAMESE RAILWAYS—SIDING AT THE MEHNAM FOR THE SUPPLY OF SAND BALLAST AT KM. 340 OF THE NORTHERN LINE

built as far as Muang Long, owing to the discontinuation of the works beyond Meh Puak.

Rolling Stock.—No special rolling stock having been purchased for this line the amount of Ticals 185,701 appearing under this item forms a share of the cost of Rolling Stock for the lines from Pitsanuloke to Utaradit and from Ban Dara to Sawankaloke. Besides this item includes to expenses for the repairs and overhauling of the rolling stock used for construction purposes.

The Administration expenses. — With Ticals 324,973. which equals 8.5% of the total expenses, the average of 7.9% is somewhat exceeded. This is due to this amount including the salaries of the engineering staff beyond Meh Puak before discontinuation of the works and further owing to the compensations which had to be paid in dissolving the agreements of the staff.

Prospects of the line.—Leaving the Menam plain at Utaradit and entering the hill districts this section of the Railway opens up a market the economical conditions of which greatly differ from those of the places hitherto traversed by the Northern Line. Though the navigable facilities as far as Utaradit on the Menam Yai are comparatively poor they are by far superior to the means of transport available outside the reach of waterways. The usual means of transport are carriers and pack animals. The rate of transport is consequently enormous and rarely or never less than 1 Tical per tkm., whereas the Railway rate is only a fraction of $\frac{1}{10}$ to $\frac{1}{100}$. It is clear that only goods of high value can stand such high transport rates. The introduction of the Railway creates therefore more or less a revolution of the existing trade relations. The day the traffic was opened to Meh Puak the trail leading over the Kao Plung pass to to Utaradit was abandoned by the caravans leaving the field entirely to the Railway. The monetary effect, however, is only small at the beginning, as the trade with goods of a bulky nature and inferior value with which the Railway has to reckon, has first to be built up. Besides the Railway only touches one of the places of consumption *i.e.*, the plain of Prae.

The full benefit of the Railway will only be reaped when same is carried to the places, which now depend solely on caravans, *i.e.*, to Prae, Muang Ngao, Chiengrai and Chiengsen.

The trade at Meh Puak Station since its opening to traffic, that is for ten months, amounted to Ticals 64,875, of which Ticals 23,667 represents receipts from passenger traffic. A satisfactory increase both in the passenger and goods traffic was shown in each successive month that the line was open.

Extension.—On the 26th June, 1911, the Royal Railway Department received instructions to shift the temporary Railway terminus of the Northern Line for about 5 Km. farther north to a place called Dene Chai, for which purpose Ticals 265,000 were allowed. This decision has been given in consideration of the various advantages which Dene Chai will offer against Meh Puak. Whereas the latter place is still lying somewhat in the hills on the incline leading to the Kao Plung pass. Dene Chai is situated at the foot of the hills on the plain proper, thus being of easier access. A cart-road connecting this station with the road system of the province of Prae is under construction. As soon as this road is completed traffic will be opened as far as Dene Chai.

On 26th January, 1912, instructions were issued to the Royal Railway Department to continue the construction of the Northern Line as far as Chiengmai. The distance to that place from Dene Chai is 222 Km. The cost has been estimated at Ticals 17,000,000 and works have been started forthwith.



ROYAL SIAMESE RAILWAYS—THE BRIDGE OVER THE MEHNAM AT KM. 366 OF THE NORTHERN LINE, UNDER CONSTRUCTION



ROYAL SIAMESE RAILWAYS—BRIDGE OF 25×40×25 METRE SPANS OVER THE QUASO NOI RIVER AT KM. 314 OF THE NORTHERN LINE

HIGHWAY BRIDGE ACROSS THE YELLOW RIVER AT LANCHOUFU, KANSU

A REMARKABLE FEAT OF TRANSPORTATION

Amongst the most important engineering works so far accomplished in the Far East the Lanchoufu Bridge is one which should not escape the notice of those who are interested in such enterprises.

It may be noted that Lanchoufu, being the capital of Kansu, is the centre of trade of that Province. The river, on whose bank the city of Lanchou stands, was formerly spanned by



TWO VIEWS OF THE LANCHOWFU HIGHWAY BRIDGE

a bridge of 24 floating pontoons, as seen in one of the illustrations accompanying this article. How much it cut off the traffic and interrupted the development of trade and industries is obvious. But it was not till 1906 that this fact attracted the serious attention of the Provincial Authorities and that an iron bridge was proposed to be built in place of the pontoons.

After certain negotiations held between the Agent specially deputed by the Viceroy of Kansu and Messrs. Telge & Schröter at Tientsin, a preliminary agreement was signed by the latter firm, which was to undertake the construction of the bridge subject to the decision of the Engineer to be sent to make an inspection of the site.

Mr. W. R. T. Tuckey, B.E., M.I.C.E., now Engineer-in-Chief of the Southern Section of the Tientsin-Pukow Railway, went to Lanchou on behalf of Messrs. Telge & Schröter and made a careful inspection and observations of that part of the river where the proposed bridge was to cross. On his return in January, 1907, Mr. Tuckey produced a report giving all the information necessary to design the bridge and concluded by recommending that the bridge should be built.

It was not long before Messrs. Telge & Schröter, basing their plans upon Mr. Tuckey's report, entered into a final agreement with the Commissioner of Foreign Affairs of Kansu Province for undertaking the work, which was to be completed within 18 months after the arrival of material in Tientsin. This period of 18 months was indeed very short when one takes into consideration the difficulty of transporting all the plant, machinery, girders and materials, as well as the skilled workmen, by native carts—the maximum load of each cart being only 1,200 catties or 1,000 lbs.—for the most part of the 1,000 miles journey from Tientsin to Lanchoufu. In fact, this difficulty in transportation alone made the work worthy of note, as it required much skilful management and was of a nature that has been seldom experienced in engineering work in the Far East, or at least in North China.

In the latter part of 1907 active work was commenced, and in spite of the great difficulties of transportation, the whole bridge was completed within the time stipulated in the agreement. Great credit is due to the Kansu officials who were in charge of transport.

The girders were constructed in Europe in accordance with the specifications drawn out by Mr. Tuckey and sent out in parts to be erected at the site. The bridge was designed to carry a load of 120 lbs. per square foot of floor area and built entirely under the supervision of Mr. R. Coltman, an expert Engineer. It is needless to say that the whole work is of a first class quality, as in the agreement the firm of Messrs. Telge & Schröter is bound to guarantee the safety of the bridge for 80 years after its completion.

The following gives a brief description of the bridge:—

The Bridge is a Steel Lattice Girder Highway Bridge. The total length, between abutments, is 760 feet, or 230 metres; made up of five spans of 153 feet each; the width is 8 metres, a carriage-way 6 metres wide, with a foot-path, one metre wide on each side.

The underside of the girders is 12 feet above the "Normal" water level. The bed of the river is composed of gravel and boulders, overlying rock, conglomerate and clay at varying depths.

The substructure consists of four concrete piers, sunk by the Pneumatic process. Several bridges on the Chinese Government Railways, Peking-Mukden Line, (formerly known as Imperial Railways of North China) were constructed in a similar manner some years ago. A full description of the carrying out of two of these works, with plans, is given in a paper read before the Institution of Civil Engineers, England, in 1904-5, and is published in Volume CLX of their *Minutes of Proceedings* under the heading "Railway Construction in North China."

THE TALKING COCOANUT

"While in the Government employ in the Philippines," says Sanford Jones, Manager at North Yakima, "I was stationed on the Island of Basilan, which is a small island in the Sulu Archipelago. The natives of this island were so uncivilized that they did not even know the value of money, and of course had never heard of a telephone. We frequently had them entertain us with their native dances, and in turn would fill them with wonder and awe with a phonograph which we had in our outfit. We found it necessary to put up a telephone line between two buildings that were a little distance apart, which we did, using two Western Electric Magneto Sets. One day I found a rather large cocoanut under a tree near the bamboo hut we were living in, and conceived the idea of making a cocoanut talk. So I emptied its contents and hung it on the outside of the house opposite the phone, so arranged that we could put the receiver through the grass wall and drop it into the cocoanut. We invited some of the natives to see the wonderful cocoanut that we could make talk, and with the aid of an interpreter at the other phone who understood their language, we had a lot of fun. Some of the natives were so frightened they left the village, and one day a delegation of natives came and asked us to burn it, as they did not like to have so uncanny a thing around. So with great ceremony and much rejoicing we consigned it to the flames, and to this day I suppose they are telling their children about the cocoanut that could talk."

PEPPERMINT OIL INDUSTRY IN JAPAN

The following particulars regarding the Japanese peppermint oil industry have been received from H.M. Commercial Attache at Yokohama (Mr. E. F. Crowe):—

Japanese peppermint is remarkable for the large proportion of menthol crystals it contains. The dementholised peppermint oil of Japan is disagreeable in taste and odour, and cannot compare with that of other countries, but owing to the large percentage of crystallisable menthol contained in the raw oil the product is nevertheless a valuable one and the export considerable. The trade is remarkable for its fluctuations. The exports of menthol in 1911 amounted to 151,538 lbs,, valued at £98,300, and of peppermint oil to 229,800 lbs., valued at £63,900. The total crop is a small one, and as the demand is not very large, it often happens that the farmers, tempted by the good prices obtained in the preceding year, rush to extend their acreage under this crop, with disastrous results.

In 1911 the farmers realised very good prices for their peppermint leaves, and under ordinary circumstances it is certain that there would have been an excessive supply of peppermint planted this year, but owing to the high prices obtainable for rice, farmers as a general rule preferred to plant it instead of peppermint. The result is that though this year's crop of the latter is larger than that of last year, the price has kept very high because the demand for menthol in Europe—for reasons unknown in Japan—seems to have increased.

In the Odashitsuki, Okujoto and Bingo districts there are Peppermint Guilds, which examine the oil and give a certificate as to its weight and purity. As regards oil from the other districts the refiner has to take his chance. When the oil has been dementholised in Yokohama or Kobe, as the case may be, the menthol and oil are put up separately in tins of 5 lbs. each, 12 tins to a case, and are ready for export. In Japan itself the consumption of menthol is not very large, roughly about 15,000 lbs.

LUMBER IN THE PHILIPPINES

Two million board feet of lumber monthly is the splendid record which will be made by the Insular Lumber Company, starting with the new year, and this compares favorably with the output of many of the large mills of the United States, says the *Manila Times* of December 20, and continues:—Officials of the company stated yesterday that this, together with the fact that they have a new fleet of vessels for the transportation of the product, would more than enable them to meet the local demand, and also to continue their large shipments to the Pacific coast and China.

The product of the mills is rapidly gaining favor in the United States, especially as nothing but first class lumber is shipped, the greater part of this being quarter sawed, which is in great demand among the furniture manufacturers. The transportation facilities of the company consist of the powerful tug boat, formerly called the Robert K., and now named the W. P. Clark, and six large new steel barges, with 32 foot double hatches. In addition to this the company has a steamer on the Himagahan river, upon which the mill is located.

The last report of the inspector of the bureau of forestry, dealing with the inspection made in August, has just been received, and is most complimentary to the company and its system. The report speaks of the excellent provision made for the employes of the company, who live in a model city, with a market which brings the people from miles around, to the number of three or four thousand weekly.

A cockpit is run, under the supervision of the company's officials, excellent water is piped through the town, and medical services are furnished free. The inspector speaks also of the high grade of lumber turned out, and of the excellent and complete equipment of the mill, as regards machinery. The logging methods are spoken highly of, as well as the operation of the railroad, which is now hauling from a distance of nine miles.

The typhoon of October did considerable damage to the plant, although the new mill was not harmed. The water in the Himagahan river rose some thirty feet within a few hours, flooding the old mill and sweeping down all of the lumber stored near the river bank, and damaging the houses on the lower level. The monetary damage only amounted to about P.10,000, however, which was fortunate, considering the value of the plant, and the damage done elsewhere.

Labor conditions are excellent, the firm employing more than seven hundred Filippinos, and so well satisfied are the people of the district with the treatment afforded, that it would be possible to double the force within a few days, if necessary. Eighteen Americans are employed at the plant, all living in model residences, with electric light and running water, and having the advantage of an ice plant and cold storage.

Heretofore the local demand has taken the greater part of the company's output, but with the increased production, the export business will receive more attention, especially since the use of Philippine woods is becoming more general in the United States. Freight rates, while not low, are satisfactory, and lumber is a desirable cargo among ship owners. All in all, the future looks pretty bright for the company, and the prospect should please the party of directors, who are now en route to the islands.

FAR EASTERN RAILWAYS

CHINA

OFFICIAL RETURNS OF REVENUE

The following revenue returns of the railways of China, which are official, will be found of interest:—

Tientsin-Pukow Railway

(Northern Section)

Receipts for the first ten days of November, 1912.

Passengers	$54,851.155
Goods	$34,516. 50
Total	$89,367.655

For the second ten days of November, 1912.

Passengers	$62,106.365
Goods	41,182. 77
Total	$103,379,135

For the third ten days of November, 1912.

Passengers	$60,577.395
Goods	45,003. 68
Total	$105,581.075

Shanghai-Nanking Railway

The following figures of traffic returns (approximately) for the week ended December 14, 1912 are issued by the Shanghai-Nanking Railway:—

For the Week.

Year.	Passengers.	Goods and Sundries earnings	Total
	$	$	$
1912....	41,608	9,758	51,366
1911....	58,790	6,825	65,615
Increase.	—	2,933	—
Decrease.	17,182	—	14,249

For fifty weeks.

Year.	Passengers.	Goods and Sundries	Total
	$	$	$
1912....	2,140,199	396,656	2,545,855
1911....	1,822,549	299,311	2,121,860
Increase.	326,650	97,345	423,995
Decrease	—	—	—

The week ended December 21, 1912:—

For the Week.

Year.	Passengers.	Goods and Sundries	Total
	$	$	$
1912....	38,567	8,200	46,767
1911....	52,304	6,810	59,114
Increase.	—	1,300	—
Decrease.	13,737	—	12,347

For fifty-one weeks.

Year.	Passengers.	Good and Sundries	Total
	$	$	$
1912....	2,187,766	404,856	2,592,622
1911....	1,874,853	306,121	2,180,974
Increase.	312,913	98,735	411,648
Decrease	—	—	—

The week ended December 28th, 1912:—

For the week.

Year.	Passengers.	Goods and Sundries.	Total for the week.
	$	$	$
1912....	40,852	6,312	47,164
1911....	54,719	6,083	60,802
Increase.	—	229	—
Decrease	13,867	—	13,638

For Fifty-two weeks.

Year.	Passengers.	Goods and Sundries.	Total for the week.
	$	$	$
1912....	2,228,618	411,168	2,639,786
1911....	1,929,572	312,204	2,241,776
Increase.	299,046	98,964	398,010
Decrease	—	—	—

The week ended January 3, 1913:—

For the Week.

Year.	Passengers.	Goods and Sundries	Total for the week.
	$	$	$
1912*..	48,266	9,486	57,752
1911†..	52,407	4,483	56,890
Increase.	—	5,003	862
Decrease	4,141	—	—

For fifty-three weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1912*..	2,276,884	420,654	2,697,538
1911†..	1,981,979	316,687	2,298,666
Increase	294,905	103,967	398,872
Decrease	—	—	—

The week ended January 11:—

For the Week.

Year.	Passengers.	Goods and Sundries	Total for the week.
	$	$	$
1913....	49,479	10,531	60,010
1912....	52,136	5,207	57,343
Increase.	—	5,324	2,667
Decrease	2,657	—	—

For one and a half weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1913....	78,176	15,833	94,000
1912....	96,432	8,568	105,000
Increase.	—	7,265	—
Decrease	18,256	—	10,991

The week ended January 18:—

For the Week.

Year.	Passengers.	Goods and Sundries.	Total for the week.
	$	$	$
1913....	45,907	9,557	55,464
1912....	48,064	4,453	53,417
Increase.	—	5,104	2,047
Decrease	3,057	—	—

For two weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1913....	124,083	25,390	149,473
1912....	145,396	13,021	158,417
Increase.	—	12,369	—
Decrease	21,313	—	8,944

Summarized Statement

		Total
Peking-Mukden.....	Nov. 1912	$1,590,327. 60
Tientsin-Pukow (Northern & Southern Sections)	„ „	$ 524,678.865
Peking-Hankow	Nov. 1912	$1,328,745. 01
Tao-Ching Hongping Taels 39,957.85 c. @ 7.10	„ „	$ 56,278. 70
Tcheng-Tai	„ „	$ 249,631. 97
Peking-Kalgan.....	Dec. „	$ 200,157.815
Kalgan Extension ..	„ „	$ 31,479. 30
Pien'o	Oct. „	$ 82,572. 70
Canton-Kowloon	Sept. „	$ 47,660. 40
Shanghai-Nanking ..	53 weeks	$ 2,697,538

* These figures are for the four last days in December, and the first three days in January.

† These figures are for the six last days in December, and the first day in January.

Tungyang-Mingkuo Railway.—The *Eastern Times* reports:—There is a scheme to build a railway between Tangyanghsien, Kiangsu, and Mingkuo-fu, Anhwei, extending 115 miles at the cost of $6,000,000. The rich people of Tangyang, Piaoyang, Kintan, Chienping and Hsuancheng have proposed to subscribe $2,000,000 towards the capital and they have asked the Railway Administration under Dr. Sun Yat-sen at Shanghai to rise $4,000,000. However the Railway Administration has not decided on the matter and probably it will be some time yet before it is carried out.

Nanchang Pinghsiang Railway.—It is reported by the *Eastern Times* that the Tutuh of Kiangsi has received the following telegram from the Department of Communications:—In planning the important railway lines in China it is found that in Kiangsi there is no line to facilitate communications while there are rich products in that province and thus people are not enjoying the benefit of having such rich products. The railway from Kiukiang to Nanchang is only a short line from Nanchang to the Yangtsze and unless the line is extended beyond Nanchang it is not of much use. At present in building the Hankow-Canton Railway there are people who propose to build a line between Nanchang and Pinghsiang so as to connect with the line between Pinghsiang and Chuchow on the one hand and with that of Nanchang and Kiukiang on the other so as to develop the industries and trade of the province. A certain British syndicate has proposed to give a loan for the said line between Nanchang and Pinghsiang and at this moment when China is simply depending on foreign capital the loan may be negotiated. The Tutuh is asked to investigate the matter.

The Ningpo Railway.—A Ningpo correspondent wrote to the *North-China Daily News* on December 23 as follows:—With a haste contrasting strangely with previous dilatoriness, the Ningpo end of the railway, which is to connect this port with Hangchow and Shanghai, has been opened to traffic. The lines have only as yet been laid to a distance of twenty or thirty *li*, and the station at the Ningpo end consists of little more than a raised platform and a galvanized iron shelter, but the formal opening was arranged to take place on Sunday last. There was a large gathering of local officials and gentry, with companies of students from the schools, and after a number of complimentary speeches, the first passenger train was occupied by the guests and ran its course. Complimentary tickets extending over three days have been issued in large numbers. There is no likelihood of any large amount of passenger traffic on the present short distance, but it is evidently expected that the demonstration of a real beginning may help to replenish the funds which are still sadly lacking.

Burma-Szechuan Railway.—Great Britain, with a view to establishing connection between Burma and Chengtu, the capital of Szechuan Province, by extending the Burmese Railway line, is now constructing a road on the frontier between Yunnan and Burma.

Canton-Huichow Railway.—The Governor of Kwangtung Province is contemplating to borrow a loan of $10,000,000 from America and another loan of $15,000,000 from Great Britain in connection with the proposed Canton-Huichow Railway.

Pukow-Sisyangchow Railway. — Shen Yun-pei, ex-Vice-Minister of Communications, has been appointed Director-General of the Pukow-Sisyangchow Railway, and he will consult with the Peking Syndicate about the flotation of the loan, but he has not yet decided whether the clauses of the agreement will follow the example of the Shanghai-Nanking or Tientsin-Pukow Railways (*Chinese Report*).

JAPAN

Railway Development.—According to the investigations of the Japan Railway Board up to the end of December last the total capital of private steam railways, light railways, and tramways, that applied for charters or were granted charters for construction during last year is represented to aggregate 296,000,336 yen, their total length reaching 6,200.57 miles.

The particulars are as follows:—

LIGHT RAILWAYS

Newly applied for charters:

Number	Mileage	Capital Yen
120	1,688.26	95,676,727
Charters granted:		
313	2,928.44	138,369,150

TRAMWAYS

Newly applied for charter:		
110	1,079.87	14,766,959
Charters granted:		
2	11.10	60,000

PRIVATE STEAM RAILWAYS

Newly applied for charters:		
2	91.40	10,300,000
Charters granted:		
11	400.80	36,400,500

Included in the above are seven steam railways and light railways with a total length of 109 miles 67 chains and capitalized at 4,505,000 yen, which were granted charters in accordance with the provisions of the Light Railway Law.

They are as follows:

Name	Mileage m. c.	Capital Yen
Higo Railway	23.40	1,000,000
Aibi Railway	9.60	350,000
Seto Electric Railway	2.63	75,000
Tono Railway	10.40	450,000
Aichi Electric Railway	8.64	1,500,000
Nobi Electric Railway	31.40	540,000
Shunan Electric Railway	18.00	4,575,000
Total	109.67	4,575,000

Extensions and Repairs.—Baron Goto, the Japan Minister of Communications, is quoted in the *Asahi* on the subject of the postponement of the extensions to and repair of the railways. He is stated to have said that in view of the faulty administration of the preceding Cabinet, he would be obliged to observe a policy of curtailment in the railway works for the next fiscal year, as there was no prospect of his being able to raise the required foreign loan, though something might be done to relieve the present situation if the Balkan question were brought to an early settlement. At any rate he must frame his Budget on the basis of funds that are sure to flow into his Department. He meant to get an advance of fifteen million *yen* from the Deposits Account of the Finance Department, which, added to an equal amount of profits from the existing railways, would make an available fund of thirty million *yen* to be spent upon new lines and repairs. The original estimates for 1913-1914 were 50,200,000 *yen*, of which 200,000 *yen* were to be defrayed out of the Deposits Account and the balance raised by a public loan. In the event of Baron Goto's estimates being carried out, that is to say thirty million *yen* being devoted to the work of construction and repairs, continues the *Asahi*, supposing that the work postponed from last fiscal year amounted to ten million *yen* and will consume the amount out of the funds provided for the next fiscal year, there will remain only twenty million *yen* to be applied for works that were originally calculated to require 50,200,000 *yen*. It comes to this, therefore, that work will be carried on only on such lines as are nearly completed and improvements will be restricted to such as are of absolute necessity. Suspension, rather than postponement, is the word fitted to describe the present situation of railway work in this country.

KOREA

Korean Railway Extension.—Mr. G. Oya, chief of the Korean Railway Board has made the following statement concerning the railways in Korea. The appropriation asked for the Railways in Korea for the coming fiscal year is yen 8,500,000. Out of the above estimates some will be spent for the extension of the line between Seoul and Wonsan, and also for the Honan line, while there will be some asked for the reconstruction of the iron bridge over the Hangku River. The mileage of the Seoul-Wonsan line is 135 miles of which 60 miles from Seoul to Teolwan is already open for traffic. Further on, there is a line of 15 miles reaching the peak of Honpulrian on which there is a construction engine ahead at work. Twenty miles from Wonsan there is a line now completed and there are fourteen tunnels and twenty iron bridges on the line beyond Honpulrian. The completion of the whole line is expected in 1915. In the Honan railway Tadeon and Hoppo and 85 miles from Tadeon to Honan, and the branch line to Unsan, 15 miles in extent, are already open for traffic. The line between Honan and Hoppo will be completed next year. The reconstruction of the Hangku iron bridge will be started next year.

Tongnai Light Railway.—On July 2 last the Korea Gas Co. of Fusan, owners of the Fusanchin-Tongnai light railway, obtained from the Korean Railway authorities permission to extend the line to Taiku via Ulsan and Kyongju and also to construct a branch line from Kyongju to Yongil Bay, the aggregate length of the lines to be newly laid exceeding 100 miles. Mr. Udaguchi, President of the company, subsequently announced that the construction work would be undertaken next spring. It is now stated that it will be difficult for the company to undertake the work at least for the time being. The company is capitalized at three million *yen* and for several years past it has been unable to pay any dividend to its shareholders. This year, however, a small dividend was paid, but the company is far from possessing any large amount of surplus money. Under the circumstances, the undertaking of the new enterprise above referred to will entail an increase in the capital of the company, besides the non-payment of dividend for some years to come. Many shareholders of the company therefore object to the work being undertaken at present.

Yalu Railway Bridge.—The Yalu Railway Bridge was to be lighted by electricity from December, 1912. The Bridge was to be divided into two lighting sections at the middle. The lighting of the northern half will be undertaken by the South Manchuria Railway, and the southern half by the Chosen Railway.

SIBERIA

The Amur Railway.—From a report on the Russian Budget for the year 1912 and the Provisional Gross Estimates for the year 1913 by Mr. Hugh O'Beirne, Councillor of His Majesty's Embassy at St. Petersburg, it appears that £600,000 were assigned for the purpose of rebuilding certain portions of the Trans-Siberian Railway in 1912. The total cost of the work, which is nearing completion, is now put at £7,700,000. The sum for duplicating the track of the Trans-Siberian Railway is estimated at £8,900,000. Up to the end of 1911 £4,400,000 had been assigned and £2,200,000 were assigned in 1912. The estimated cost of the Amur Railway in £22,900,000. Up to the end of 1911 £7,500,000 had been assigned and £7,700,000 were assigned in the present year.

MANCHURIA

South Manchuria Railway.—Some of the fresh enterprises originally planned to be taken in hand during the present fiscal year by the South Manchuria Railway Company have been put off to the next fiscal year. In consequence, a curtailment of about Y2,000,000 has been effected in the capital expenditure set aside for the present fiscal year. It is expected that a reduction by about an equal amount will be made in the capital expenditure for the next fiscal year, making the amount under that item for actual defrayment about Y14,000,000, which will be invested principally in the undermentioned undertakings:—

Improvement of the Main Line and the Mukden-Antung Line; construction of passenger and goods cars; prosecution of Dairen Harbour Works; widening of the entrance to the Kawasaki Dock; foundation work for the new premises of the Central Laboratory; establishment of an agricultural experimental station at Kungchuling; construction of transfer arrangements between steamer and wharf at Antung; construction of new warehouses at Yingkou, &c.

The management of the South Manchuria Railway is reported to have decided to construct a third quay to the west of the Main (West) Quay at an estimated cost of Y3,000,000. According to the present plan, the new quay is to start at 900 ft. west of the Main Quay and is to project outward 1,950 ft. in a parallel line to the other. It will have a width of 400 ft. The shore line intervening between the Main Quay and the new quay, 900 ft. long, will be also included in the new quay line, making its total length 5,200 ft., capable of berthing twelve vessels. The aggregate berthing capacity of this port, when the new quay is completed, will reach about thirty vessels. The central base between the Main Quay and the proposed new one will have 25 ft. of water, and the farthest sections of the new quay 33 ft. of water, in both cases at low tide. The construction of the new quay, which means the creation of another Basin at the west of the existing one, will be put in hand early in the next fiscal year, and will be completed in about five years.

The receipts of the South Manchuria Railway Co. during Dec. 1912, amounted to Y2,618,722.38. Compared with those of the same month of the previous year the returns show an increase of Y317,680.44.

Chinese Eastern Railway.—Despite all adverse circumstances such as the pneumonic plague outbreak, the revolution, strained diplomatic relations between China and Russia, etc., the business conditions of the Chinese Eastern Railway are showing improvement from year to year. During 1911, the total amount of general cargo handled by the Railway Company reached 75,000,000 poods, which was an increase of 17,000,000 poods in comparison with the previous year. In the above mentioned figures are contained the following cereals:—

Beans	18,000,000 poods
Wheat	7,800,000 „

Flour	3,200,000	poods
Various Seeds	1,200,000	„
Kaoliang	1,000,000	„
Bean Cake	1,000,000	„
Bran	900,000	„
Millet	800,000	„
Oats	700,000	„
Barley	750,000	„
Buckwheat	47,000	„
Other Cereals	450,000	„

As the area of agricultural land in North Manchuria is considered to have been considerably expanded during this year, farming products have no doubt proportionately increased, so that the return of railway receipts for 1912 will eclipse that of 1911.

The Pensihu Railway.—The Metei Company of Manchuria has raised the sum of 1,700,000 taels towards the construction of the Pensihu Railway, which is intended primarily to develop the Chinese coal and iron industries. The plans are for the adoption of standard gauge and for the construction of nine railway stations.

The Aigun-Wenchow Railway.—Tutuh Soon Hsiao-lien of Heilungkiang has wired to Peking that Russia has despatched over twenty Russia surveyors to operate on the proposed Aigun-Wenchow Railway and also sent a number of engineers from the Chinese Eastern Railway Co. They declared that they will freely construct that line following in the steps of the Japanese construction of the Antung-Mukden Railway.—(*Chinese Report*).

TRAMWAYS

Shanghai Tramways.—The returns of the Shanghai Tramways (Foreign Settlement) for 12 months ended 31st December, 1912, are as under:—

	1912.	1911.
Effective Receipts (after deducting loss by exchange)	$797,832.04	$636,363.16
Passengers carried	40,734,233	27,257,250
Car miles run	2,747,088	2,241,113

The loss by exchange of subsidiary coinage for the year 1912 was $230,374.78 equal to 24.55% of the gross cash collected on the cars as compared with $168,848.31 equal to 22.93% for the year 1911.

For the week ended 1st January, 1913:—

	1913.	1912.
Effective Receipts (after deducting loss by exchange)	$14,455.20	$14,496.83
Passengers carried	704,124	699,477
Car miles run	47,974	51,175

The loss by exchange of subsidiary coinage for the week was equal to 21.97% of the gross cash collected on the cars as compared with 24.22% for the corresponding week last year.

For the week ended 8th January:—

	1913.	1912.
Effective Receipts (after deducting loss by exchange)	$16,315.35	$14,403.10
Passengers carried	789,872	710,991
Car miles run	51,363	51,299

The loss by exchange of subsidiary coinage for the week was equal to 20.34% of the gross cash collected on the cars as compared with 24.75% for the corresponding week last year.

For the week ended 15th January:—

	1913.	1912.
Effective Receipts (after deducting loss by exchange)	$14,733.20	$14,144.56
Passengers carried	714,639	695,753
Car miles run	50,489	51,625

The loss by exchange of subsidiary coinage for the week was equal to 20.57% of the gross cash collected on the cars, as compared with 24.77% for the corresponding week last year.

For the week ended January 22:—

	1913.	1912.
Effective Receipts (after deducting loss by exchange)	15,232.78	13,024.25
Passengers carried	737,034	646,161
Car miles run	49,445	50,754

The loss by exchange of subsidiary coinage for the week was equal to 20.67 per cent. of the gross cash collected on the cars as compared with 24.90 per cent. for the corresponding week last year.

Yokohama Electric Railway Co.—The Yokohama Electric Railway Company, at a general meeting of its shareholders recently held, decided on declaring a dividend of 8 per cent. per annum for the half year just ended, and this was followed by an extraordinary meeting at which a bill was passed for increasing its capital from 3,000,000 *yen* to 6,000,000 *yen*.

Shanghai Chinese Trams.—The Chinese Electric Tram Car Company was formed about eight months ago. There are five bridges to be built from the Shih-lu-pu to the Railway station of the Shanghai-Hangchow Railway and two bridges have been completed and there are three more bridges to be built, but these three bridges can be built when the rails are laid. Materials bought abroad are arriving at Shanghai, such as 156 rails, 93 rails for the sheds, and over 370 cases containing materials for electric batteries all of which are now in Shanghai. Rails inside the sheds for electric cars in front of the station of Shanghai-Hangchow Railway it was expected will be laid before the China New Year (Feb. 6th.) The electric poles, etc. will soon arrive at Shanghai.

Osaka Electric Railway Co.—Some time ago the company attempted to negotiate a loan from Samuel, Samuel & Co. through Masuda, a bill broker, but it failed on account of disagreement on terms, and the company next consulted Sale, Frazar & Co., but again it was not successful. As a final step the company has planned to import foreign capital in the name of the Electricity Trust Company with whom it operates. The president of the latter, Mr. Iwashita has approved the plan and at present he is negotiating with Samuel, Samuel & Co. through Masuda. The amount of the loan is put at one million yen with interest 7.5 per cent. or 8 per cent. including fees.

PERSONAL

Captain Pruneau of the French staff at Tientsin has been promoted to the rank of Chef de Battalion.

Mr. Crane has been appointed to succeed the late Mr. Edwards as representative of the Eastern Extension Telegraph Company at Peking.

Governor-General Forbes of the Philippines returned from furlough in January.

The death is announced at Hankow of Mr. W. Ostapenko, secretary to the Russian Municipal Council for about seven years.

Mr. G. H. Phipps, H. M. Acting-Consul at Kobe, was married to Miss Aline Purvis, youngest daughter of Professor F. P. Purvis, of the Engineering College of Tokyo, Imperial University, at St. Andrew's Church, Tokyo, on December 28, 1913.

Mr. F. M. T. Lange, Chief Electrical Engineer of Messrs. Samuel & Co., Shanghai, took over charge of the local office of the firm on December 25 as Manager during Mr. Keable's prospective absence.

Dr. E. Ohrt, German Consul at Nagasaki, returned to his post on December 23 via Siberia, after completing his furlough and visit home. Mr. R. Buttmann, who had been in charge of the Consulate during his absence, has been transferred to Shimonoseki as successor to Consul Müller.

Baron von Frankenstein, Councillor of the Austro-Hungarian Embassy, has been appointed Director of Commerce in London, and will leave for his new post early this year. He is most likely to be succeeded by Dr. Szent-Ivany von Lipto Szent-Ivan, who has been Secretary of the Legation at Bukharest.

It is reported that Lord Kilmarnock has been appointed to Tokyo as Second Secretary of the British Embassy.

Mr. Bela de Szentirmay-Darvasto, Austro-Hungarian Consul at Yokohama, has been promoted Consul-General and will remain in charge of the Consulate.

Mr. J. H. Laughlin, who was some years ago a very popular member of the American Embassy in Tokyo, has now been appointed as Secretary of the United States Embassy in London.

Prince Suleiman, former Sultan of Zanzibar who is on a voyage round the world, is expected in Japan shortly.

Mr. D. Crackanthorpe, First Secretary of the British Embassy at Tokyo who recently left for home on furlough, will not return.

Mr. E. M. Hobart-Hampdon, Japanese Secretary of the British Embassy, will soon leave for England on a year's furlough. It is said that Mr. Harold G. Parlett, British Consul at Dairen, will take the place of Mr. Hohart-Hampdon.

Mr. Butler, who has been acting as British Vice-Consul at Kobe, has been transferred to the Consulate at Tamsui.

Herr von Syburg, German Consul-General at Yokohama left for Berlin on January 4th by the Siberian route, to take up his new post as Minister to Abyssinia.

Mr. and Mrs. S. F. Mayers left Peking for Europe by the Siberian express on January 14. Mr. Mayers has been called home by the British and Chinese Corporation, whose representative he is in Peking, to give information to the Sextuple Group in London. Mr. G. A. Robertson will be in charge during the absence of Mr. Mayers.

Mr. Yoshida, Japanese Minister to Siam, was to leave for his post on January 30.

Sir Conyngham Greene, the new British Ambassador to Japan, and Lady Greene, were to sail for Japan on January 9.

News has been received in Tokyo that Dr. Baeltz, for a long time professor of the Medical College of the Tokyo Imperial University and a physician to the present Emperor in His Majesty's boyhood days, is now seriously ill in Germany.

Mr. Henri Stroehlin, First Secretary of the Swiss Legation in Tokyo, has been transferred to Paris in the same capacity. Mr. and Mrs. Stroehlin are now in Switzerland on leave. Mr. Stroehlin will be succeeded by Mr. de Stouz, First Secretary of the Legation in London.

Mr. Lars Anderson, the new American Minister to Japan, arrived in Tokyo on December 28, and was welcomed by a number of high officials. This is Mr. Anderson's fourth visit to Japan. Mr. and Mrs. Anderson, on their arrival in Seoul, on December 21, were met at the South Gate Station, by Mr. Yamagata, Administrative Superintendent, and the Departmental Directors of the Korean Government General, Mr. Scidmore, American Consul-General, and many other prominent men.

The death occurred at Tientsin on January 4 of Mr. Gustav Detring, formerly Commissioner of Customs at Tientsin, at the age of seventy.

M. Dejean de la Batie, Consul-General for France, left Shanghai for home on January 10. He is succeeded by Consul-General Kahn from Tientsin, who in turn has been succeeded there by M. Saussine from Chefoo.

Mr. Cyril J. Atkinson, M. I. Mech. E., inventor and patentee of the Atkinson Gas Producer and a number of special devices pertaining to Gas Producers, has severed his connection with the Dornfeld-Kunert Company of Watertown, Wisconsin and his services and the use of all his patents have been secured by Fairbanks, Morse & Co., and a number of Mr. Atkinson's valuable patents will be incorporated in the Fairbanks-Morse Gas Producers at once. This Company will place Mr. Atkinson's services at the disposal of the public for adapting the Fairbanks-Morse Gas Producers to meet the requirements of the various industries desiring to substitute producer gas for fuel oil. This will be of particular service and effect large economies in Forge shops, Malleable iron foundries, Galvanizing plants, Enamelling works, Brass undries, etc.

Mr. Thomas Sammons, American Consul-General at Yokohama, and Mrs. Sammons, returned to Yokohama on December 18 by the Pacific Mail Steamship *Mongolia*. Mr. Sammons departed on leave in May, and reports having had a very busy holiday. He crossed the American continent four times while absent, the greater part of the time being devoted to meetings with the chief commercial bodies and the leading manufacturers and exporters of the country. The Consul-General was also commissioned by the Foreign Office of his country to be present at the International Congress of Chambers of Commerce at Boston during the latter part of September.

Dr. Oya, Director of the Korean Railways, gave a dinner party at Seoul, on December 21, in honour of M. Radigin, a high official of the Chinese Eastern Railway.

Mr. Alexander Clark on December 12, 1912, celebrated the fiftieth anniversary of his arrival in Japan, at Yokohama.

Dr. Roest, the Currency Adviser to the Chinese Government, died suddenly at Mukden on January 11, while en route from Europe to Peking, under tragic circumstances.

Dr. Nathaniel Burwash, Chancellor of Victoria University, was to reach Yokohama on January 26th by the *Siberia*.

Mr. C. F. Benrath, manager of the shipping department of Messrs. Illies and Co., will return to Yokohama early in February.

The Danish Minister in Tokyo, Count Ahlefeldt Laurvig, who is also accredited to China, left for Peking on January 10th.

Mr. C. A. Beal, of the American General Electric Company, reached Yokohama on board the P.M.S.S. *Korea*.

Mr. R. André, of the French Embassy at Tokyo has been appointed Acting-Consul in Seoul during the absence of Mr. A. Guerin.

Herr J. F. B. van Blokland, Netherlands Minister in Peking, will start on leave in February.

News has been received of the death of Mr. J. B. Jackson, who was, until comparatively recently, Commissioner of Trade for Canada at Shanghai.

Mr. H. E. Fulford, C.M.G., has returned from home and has taken over H.B.M. Consulate-General at Tientsin from Mr. Barr, the Vice-Consul who has been acting since Mr. Wilton's transfer to the Legation at Peking.

Mr. Clarence Edward Gauss has been appointed Vice-Consul-General at the U. S. Consulate, Shanghai, in succession to Mr. W. R. Dorsey, who left recently to take up an appointment as Consul in Spain. Mr. Gauss is well-known to Shanghai, having been Deputy-Consul at the local Consulate from 1907 to 1909. Since the latter he has been attached to the Department of State in Washington.

Maj.-Gen. K. Shiba, Chief of Staff of the Kwantung Government, has been transferred to the Directorship of the Bureau for Military Affairs of the War Department, Tokyo, in succession to Maj.-Gen. Tanaka, transferred.

Senior Secretary Ohuchi, of the Kwantung Government, has been decorated with the third Class Order of the Sacred Treasure.

Mr. Wilton, who has been acting British Consul-General at Tientsin for some time past has gone to Peking to take over his new position in succession to Sir Alexander Hosie.

COMPANIES

Osaka Gas Company.— The above company has a capital of six million yen at present and with the extension of business it is in need of increasing the capital during the latter half of this year. The directors of the American side has already given their consent, but in connection with the tramway line question the company has become the centre of attack, and the plan for increasing its capital has been given up temporarily. The pressing need of capital however is not mitigated and the company instead of increasing capital has decided to raise debentures to the amount of about three million yen. The new debentures will be subscribed by the shareholders, and will not be opened to public subscription.

Japanese Companies.—According to the Japanese Ministry of Agriculture and Commerce the number of newly organised companies during last month was 400, with capital paid up amounting to 9,086,745 yen. The number of companies which were organised during the year 1912 reached 3,888 with capital paid up amounting to 110,919,882 yen which shows an increase of 770 in number and 16,619,507 yen in capital when compared with those of the previous year.

These companies may be classified as follows:—

Nature of undertaking	Number	Capital paid up Yen
Agriculture	76	3,911,845
Fisheries	26	895,698
Forestries	6	882,825
Brewing	130	1,587,245
Food and drinks	131	3,832,741
Fibre Industries	270	8,620,064
Chemical Industries	108	2,668,650
Ceramic Industries	41	595,125
Metal work	54	957,450
Cartwright and Shipbuilding	14	1,275,400
Manufacture of machines and implements	122	2,524,810
Gas and Electricity	123	6,950,000
Miscellaneous industries	392	7,517,092
Mining industries	27	6,064,000
Commission business	991	11,295,734
Warehousing	65	553,815
Banking	28	11,223,500
Trust business	219	3,814,345
Insurance	5	1,750,000
Miscellaneous	845	27,744,548
Conveyance and communication	216	6,255,995
Total	3,888	110,919,882

It is to be understood that joint stock companies, partnership companies, and limited partnership companies are included in these new companies.

Fuji Spinning Company.—The thirty-fourth semi-annual general meeting of the Fuji Cotton Spinning Company was held on December 21, presided over by the Managing Director Mr. Wada. The chairman submitted the business report for the term just ended. The following plan of accounts and distribution was unanimously adopted:

	Yen
Net profit for the term	1,245,913
Balance brought over from the previous term	216,573
Total	1,462,486
To be distributed as follows:	
Legal reserve	62,295
Reserve against loss	62,295
Bonus to operatives and pension funds, etc.	124,580
Bonus to directors	62,295
Dividend to shareholders (12% per annum)	600,000
Balance carried forward	551,011

Hongkong Land Investment Company.—The report of the Directors of the Hongkong Land Investment and Agency Company, Limited which was to be submitted to the shareholders at the twenty-fourth ordinary meeting on January 27, was as follows:—The net profits for the year 1912, including $41,758.85 brought forward from last account, after paying all charges amount to $400,421.19. From this amount an interim divided of $3.50 per share has already been paid. It is now proposed to pay a final dividend of $3.50 per share, and after writing off directors' and auditors' fees there remains a balance of $16,814.83 to be carried forward to the credit of a new profit and loss account.

West Point Building Company.—The following report upon the working of this company during the year ended on December 31st, 1912, was to be presented to the twenty-fourth ordinary meeting of shareholders on

January 27:—The net profits for the year, including the amount brought forward from the previous year, amount to $56,245.43. From this amount an interim dividend of $2.00 per share has already been paid, and after writing off directors' and auditors' fees, it is now proposed to pay a final dividend of $2.25 per share, making a total dividend for the twelve months of $4.25 per share, and to carry forward the balance $2,570.43 to credit of a new profit and loss account.

SHIPPING COMPANIES

Liaotung Steamship Company.—A steamship company has been incorporated at Dairen on a joint stock basis under the title of The Liaotung Steamship Company, Limited, reports the *Manchuria Daily News*. The Company is capitalized at yen 250,000, in 5,000 shares of yen 50 each. Yen 50 per share is to be called up as the first instalment. The scheme of organizing this Company was originally conceived by the Mitsui Bussan Kaisha, Dairen, and the shareholders are chiefly composed of those connected with, or interested in, that well-known firm. The first steamer for the service of the new Company will be the s.s. Edith, which has recently been purchased at Bombay. The Edith was the property of Messrs. Lambert Bros., Ltd., London, and was built in 1901 with a gross tonnage of 2,873. Her delivery to the new owners was to be effected in January. In addition, it has been decided to purchase a few steamers of 6,000 tons class from abroad for a similar purpose. The Company will be opened to business about next May. Mr. Y. Yakusawa, local Manager of the Mitsui Bussan Kaisha, Dairen, is to assume the management of the Company.

LIGHT AND POWER COMPANIES

Yokohama Electric Company. — The Yokohama Electric Company held a general meeting of its shareholders on December 21 when the following accounts were passed:—

Net profit for the current term	376,630.915
Amount brought forward	14,254.742
Total	390,885.657
Legal reserves.....	20,000.000
Reserves for redemption.....	40,000.000
Reserves for dividends.....	35,000.000
Bonus.....	30,130.000
Dividends (11 per cent. per annum)	246,140.000
Amount carried forward.....	19,419.657

Kinugawa Hydro Electricity Co.—In its extraordinary general meeting which was to be held January 29 on the company intended to propose an issue of debentures amounting to six million yen. At first the capital of the company was put at yen 13,500,000 which was afterwards increased to yen 15,000,000. Again the capital has recently been increased to yen 16,000,000 in order to meet the expenditure for the construction of the water reservoir at Lake Shimidzu. The capital has been called to the amount of yen 10,120,000. The new place of construction, however, needs a great amount of money and the company has a deficit of about six million yen which it decided to make up by issuing debentures. Leading shareholders, however, are of the opinion that the company will have to redeem one million yen which is due to Samuel and Samuel Co., and four million yen due to the Takata and Okura companies in the form of machinery, so that only one million is available. The company intends to issue debentures with the interest over 7 per cent. and the whole property of the company will be offered as securiiy. It is, however, doubtful in view of the depression of the market whether the company will succeed in the plan.

Tamagawa Electric Railway Co.—This company has adopted a dividend of nine per cent. for preferential shares but no dividend will be made on ordinary shares. The company getting the supply of electricity by the Fuji Spinning Company next year will extend the electric light business and the dividend on ordinary shares will probably be declared on the latter term of next year.

IRON AND STEEL

Projected Iron Foundry at Kyomipo.—In a recent issue the *Seoul Press* gave a brief report concerning the projected establishment by the Mitsui Co. of Tokyo of an iron foundry at Kyomipo, a port on the Taitong River, Korea. Investigation of mines in the peninsula has steadily been pursued since 1906, and it was at last decided to establish an iron foundry at Kyomipo. The erection of the plant will be commenced next September, when an expert of the company who is now in Europe inspecting iron foundries will come back. Pending the interval, mining of iron at Kyomipo and Whangju will be steadily continued, and it is expected that mines at Chailyon and neighbourhood will also be worked. Some time will elapse before the foundry will be worked to the full extent of its capacity, owing to the great amount of preparation needed, but it is hoped that it may be made profitable in two or three years. More than 100,000 tsubo of land has already been bought at Kyomipo, as a site for the projected foundry.

Hanyang Ironworks.—Some of the foreign employees at the Hanyang Ironworks and the Pinghsiang collieries have been re-engaged. The former were to arrive in January, the latter are expected in March. Full work will again be begun.

MINING

Chinese Colliery Near Yingchengtzu.—The colliery at Huashihling near Yingchengtzu Station on the Kirin-Changchun Railway will be operated on an extensive scale from next spring. The Chinese interest-holders in the colliery are inviting subscriptions to the shares of the company. The output of this colliery is said to be of fine quality.

Penchihu Colliery & Mining Co.—Machinery ordered from abroad is arriving at Penchihu for installation at the steel works in project by the Penchihu Colliery & Mining Co.

The Gumaus Co.—The Gumaus Placer Company declared a ten per cent. dividend on Dec. 20 after a six weeks run, with all indebtedness liquidated from the product saved. This meant a distribution of P.50,000 among the Manila shareholders. It is thought in some quarters that the Gumaus Company will be able to declare a ten per cent. dividend every month in future.

SHIP-BUILDING

Japanese-Built Gunboats for China.—The Yung-Hsiang, a Chinese gunboat of 830 tons, built at the Kawasaki Dockyard, Kobe, was delivered to a Chinese officer sent to watch the construction of the ship on Tuesday, January 7. At noon the following day the leading Chinese residents in Kobe were invited to inspect the gunboat. She left Kobe on January 9 for Shanghai under the command of Captain Nishio, of the Kawasaki yard, according to the agreement. The sister ship Yung-Feng, built at the Mitsu Bishi Yard, Nagasaki, left Nagasaki on January 10 direct for Shanghai.

PUBLIC WORKS

Phlippines Appropriation.—A bill appropriating one million pesos for the construction and maintenance of public highways, drilling artesian wells at different points throughout the islands, and replacing certain lighthouse towers by steel structures, was introduced in the Philippines Assembly on January 11 by the committee on public work. This bill contained a provision that P.500,000 of the total amount should be set aside for the new capitol building, which provision was rejected by an amendment, thus making the whole amount available for the purposes mentioned above.

GENERAL

It is stated from New York that one of the largest cargoes of locomotives ever shipped from America has recently been taken out to Japan by the British steamship *Shimosa*. The locomotives, 30 in number, are of the largest type, built by the Baldwin Locomotive Works, and are intended for the Imperial Railways of Japan.

The contract for the new telephone system at Tientsin has been secured by Messrs. Arnhold, Karberg and Company for the Western Electric Company. It is understood that the price is $50,000 Mex.

The opening of the works of Messrs. Lever Brothers (Japan) Limited took place at Tori-Shinden, Osaka, on January 24th.

The Manchurian Flour Mill Company, of Tiehling, Manchuria, has decided to call up 5 yen ($2.50) per share for constructing and equipping a branch mill at Changchun. The foundations have already been completed. This company distributed its net profit for the past trade year as follows: Legal reserve, $1,000 (United States currency); special reserve, $1,500; consolidation fund and depreciation reserve, $5,000; bonus to officers, $1,500; dividend to shareholders (at the rate of 10 per cent. per annum) $6,000; carried forward to the next term, $4,700.

HONGKONG AND SHANGHAI BANK

Subject to audit, the Directors of the Hongkong and Shanghai Banking Corporation, recommended a distribution of the profits for the half year ending 31st December 1912 as follows:—

Payment of a dividend of	40/- per share
Payment of a bonus to shareholders.....	5/- „ „
To be added to Silver Reserve	$200,000
To be written off Premises a/c	$200,000
To be carried forward	$2,000,00

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